INSECTS OF MICRONESIA
Diptera: Chironomidae[1]

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INTRODUCTION

Up to the present time, the Micronesian chironomid fauna has been little known. I (1940) reported nine species from the material collected by Esaki's Micronesian expedition on Saipan, Truk, Kusaie, and Ponape; Johannsen (1946) described three species from the Swezey collection from Guam. No other attempt was made to study Micronesian Chironomidae. It was therefore with great pleasure that I undertook, at the request of W. W. Wirth and J. L. Gressitt, the examination of a large collection of about 9,400 specimens of chironomid midges from various islands and atolls of Micronesia.

The United States Office of Naval Research, the Pacific Science Board (National Research Council), the National Science Foundation, and Bernice P. Bishop Museum have made this survey and publication of the results possible. Field research was aided by a contract between the Office of Naval Research, Department of the Navy, and the National Academy of Sciences NR 160-175.

I would like to express my appreciation to J. L. Gressitt, who supported this study by making available the extensive collection of the Chironomidae and by arranging financial assistance for illustrations, and to W. W. Wirth and the late Professor T. Esaki for various kindnesses. I am indebted to the above-mentioned organizations and to the following individuals for collecting Micronesian chironomids: P. A. Adams, R. H. Baker, J. W. Beardsley, R. M. Bohart, C. F. Clagg, J. F. Gates Clarke, B. McDaniel, R. Danziger, T. Downs, H. S. Ducoff, H. S. Dybas, S. Edgar, T. Esaki, F. R. Fosberg, David Frey, D. T. Fullaway, R. J. Goss, J. A. McGouan, J. L. Gressitt, K. S. Hagen, D. G. Hall, W. H. Hatheway, C. B. Keck, Y. Kondo, N. L. H. Krauss, K. L. Maehler, S. Murakami, W. A. Niering, R. G. Oakley, Z. Ono, Y. Oshiro, R. W. L. Potts, I. La Rivers, C. W. Sabrosky, F. M. Snyder, O. H. Swezey, H. K. Townes, L. D. Tuthill, and R. L. Usinger. I also thank Miss E. Ohtani, Kyoto Prefectural University, who made the drawings and assisted with the manuscript.

[1] This represents, in part, Results of Professor T. Esaki's Micronesian Expeditions (1936-1940), No. 121.

[2] Formerly Saikyo University.

Chironomids are typical nematocerous Diptera and very closely allied to the Ceratopogonidae, differing mainly in possessing atrophied mouthparts and simple wing vein M_{1+2}. Further details for separating chironomids and ceratopogonids have been given earlier in this series (1959, vol. 12, no. 3, Diptera: Ceratopogonidae). The morphological terminology used in this report is the same as for the Ceratopogonidae, (op. cit.) except for the following abbreviations.

AR (antennal ratio), ratio of elongate last segment (or last two in Tanypodinae) to short basal segments taken together of male antenna, but excluding scape (first spherical segment); fMCu, posterior fork between wing veins M_{3+4} and Cu_1; fR, anterior fork at bases of radial branches (R_1, R_{2+3}, and R_{4+5}); LR (leg ratio), ratio of length of first tarsal segment (basitarsus) to that of tibia; RL-A, relative lengths of antennal segments from basal to ultimate; RL-A8, relative lengths of eight distal antennal segments from basal to ultimate; RL-FT, relative lengths of femur to tibia, usually of fore leg; RL-L, relative lengths of seven segments of leg from femur to last tarsal segment (excluding coxa and trochanter); RL-T, relative lengths of five tarsal segments from basitarsus to last, usually of fore leg; RL-V, relative lengths of wing veins R, R_1, R_{4+5}, and stem of fMCu. Other symbols of wing veins are the same as given by Freeman (1955) and Tokunaga and Murachi (1959).

Relative lengths shown in the text were measured by an ocular micrometer with magnification of 150 $\times$ (1 unit = 0.013 mm.) for wing veins and leg segments, and with magnification of 600 $\times$ (1 unit = 0.003 mm.) for segments of antennae and palps, spermathecae, and male hypopygia.

Classification of the Chironomidae has been studied by Kieffer (1906-1926), Goetghebuer (1912-1942), Thienemann (1915-1944), Malloch (1915), Lenz (1921-1941), Edwards (1922-1938), Pagast (1931-1947), Johannsen (1934-1946), Townes (1945) and Freeman (1955-1959); however, the position of some genera and subgenera is still unsettled. The classification adopted in the present report is based on Goetghebuer's system (1936-1944), partially supplemented and modified with that of Edwards (1929) and Freeman (1955-1958).

The following symbols are used to indicate the institutions where specimens are deposited: US (United States National Museum), BISHOP (B. P. Bishop Museum), CM (Chicago Natural History Museum), KU (Kyushu University, Fukuoka), and MCZ (Museum of Comparative Zoology).

ZOOGEOGRAPHY

The results of examining 9,354 specimens of Chironomidae from the Micronesian Islands may be summarized as follows:

1. The Micronesian chironomid fauna is composed of 100 known species, of which 67 are new. Eight species (8 percent) belong to the subfamily

Tanypodinae, 26 (26 percent) to the Orthocladiinae, 5 (5 percent) to the Clunioninae, and 61 species (61 percent) to the Chironominae. Species are concentrated in a few genera of each subfamily, such as *Smittia* (17 percent of total species) of the Orthocladiinae; and *Chironomus* (22 percent), *Polypedilum* (18 percent), and *Tanytarsus* (17 percent) of the Chironominae.

2. Subfamilies Podonominae, Diamesinae, and Corynoneurinae are not known from Micronesia at present. Podonominae are recorded from the Holarctic Region, Chilean Subregion, South Georgia, and New Zealand. According to Edwards (1931), *Podonomus* appears to have its center of distribution in South America, and it is therefore possible that species of this subfamily may yet be found in Micronesia. Members of the Diamesinae are chiefly Holarctic and continental in distribution, with a few species in Africa and South America, but there seems to be little possibility of any being found in Micronesia. The Corynoneurinae are similar to the Diamesinae in distribution and habitat, but a little more widely distributed; some species possibly may be found in cold rapid streams of the high mountainous parts. In addition to these subfamilies, there are many genera of the other subfamilies which are rather common in the continental regions, but are rare or absent in Micronesia.

3. The Micronesian Chironomidae is a depauperate group with partial representation of the family and is thus similar to other insect groups on oceanic islands.

4. Marine chironomids are present, though not abundant, in Micronesia. The Clunioninae are marine in habit, except for a few peculiar Hawaiian species. They are represented by five species in Micronesia, though more species of this subfamily may be expected to be found in the future. Some species of *Smittia* will probably prove to be marine or littoral in habit. Of *Tanytarsus,* four species are marine: *halophilae, maritimus, magnihamatus* and *pelagicus;* four are possibly marine: *esakii, brachyurus, latiforceps,* and *dybasi.*

Pontomyia is a characteristic genus adapted to marine life and only found in the Pacific Ocean. One species, *P. oceana,* is now known in Micronesia, but *P. natans* Edwards, described from Samoa and also found in Japan, should be in Micronesia, although not collected there yet.

SYSTEMATICS

FAMILY CHIRONOMIDAE

Delicate, non-biting midges. Head usually flattened, mouthparts reduced, mainly represented by a pair of labella and usually five-segmented maxillary palps, ocelli absent; male antennae strongly plumose and bushy, except in Clunioninae, the maximum number of segments 15 (Tanypodinae); female antennae never plumose, usually much shorter and with fewer segments than in male (often equal number of segments in Tanypodinae). Legs long and slender, especially fore leg; in Tanypodinae and Orthocladiinae tibial spurs present on all legs and fore tibia longer than basitarsus; in

Distribution of Micronesian Chironomidae

	Micronesian Island Groups										Other Localities
			Caroline								
	Bonin	S. Mariana	Palau	Yap	Caroline Atolls	Truk	Ponape	Kusaie	Marshall	Gilbert	
Tanypodinae											
1. Clinotanypus guamensis*		G†									
2. Pentaneura (Pentaneura) ponapensis*							×	×			
3. P. (P.) ignobilis							×				Sumatra
4. P. (P.) delosa			×	×			×				Sumatra
5. P. (P.) carolinensis*		G	×	×			×				
6. P. (Ablabesmyia) monilis						×					Europe, N. America, Sumatra, Formosa, Asia Minor, central Asia, Japan
7. Anatopynia boninensis*	×										
8. A. elongata*		G	×	×		×					
Orthocladiinae											
9. Metriocnemus flavellus*							×	×			
10. M. claggi*	×		×	×							
11. M. adjecta*			×	×		×	×	×			
12. Cricotopus gressitti*							×				
13. C. sabroskyi*			×								
14. C. quadrizonatus*	×										
15. C. sp. No. 1									×		
16. Orthocladius sp. No. 1			×								
17. Nanocladius sp. No. 1			×								
18. Smittia brevicornis*			×	×							
19. S. setiforceps*			×								
20. S. palauensis*			×								
21. S. dupla*			×						×		
22. S. kraussi*			×	×	×						
23. S. triangula*			×						×		
24. S. yapensis*				×		×			×		
25. S. micronesiana*			×			×		×			
26. S. zonata*		×	×	×	×			×	×		
27. S. insulsa		×	×								
28. S. tuberculifera*	×	G	×			×	×	×			
29. S. guamensis*		G									
30. S. bicinctura*			×								
31. S. postcinctura*			×								
32. S. fusivenosa*						×					

* Described as new.
† Guam only.

Distribution of Micronesian Chironomidae

	Micronesian Island Groups										Other Localities
			Caroline								
	Bonin	S. Mariana	Palau	Yap	Caroline Atolls	Truk	Ponape	Kusaie	Marshall	Gilbert	
33. S. sp. No. 1			×								
34. S. sp. No. 2			×								
Clunioninae											
35. Clunio pacificus		×	×								Japan proper, Ryukyu Is., Samoa
36. C. tuthilli*									×		
37. Thalassomyia maritima		×	×						×		New Caledonia, China (Hong Kong)
38. T. sabroskyi*			×	×							
39. Telmatogeton pusillum		×									Marquesas Is.
Chironominae											
40. Chironomus (Chironomus) pallidinubeculosus*			×								
41. C. (C.) longilobus		×	×	×	×	×					Formosa
42. C. (C.) crassiforceps		×	×	×	×		×	×	×	×	Formosa
43. C. (C.) crassicaudus*		×	×	×							
44. C. (C.) bicoloris*			×	×							
45. C. (C.) plumatisetigerus*		G	×	×							
46. C. (C.) trifasciatus*							×				
47. C. (C.) praeapicalis*			×	×			×				
48. C. (C.) claggi*	×	G					×		×		
49. C. (C.) carolinense*			×				×				
50. C. (C.) nigerilateralis*							×				
51. C. (C.) javanus			×	×			×		×		Java
52. C. (C.) samoensis		×	×	×	×	×	×		×		Samoa, Java
53. C. (C.) sexipunctatus*		G									
54. C. (C.) sp. No. 1			×								
55. C. (C.) sp. No. 2		G									
56. C. (C.) sp. No. 3		×									
57. C. (C.) sp. No. 4			×								
58. C. (Endochironomus) palauensis*			×								
59. C. (E.) tenuicaudus*				×							
60. C. (Cryptochironomus) javae			×	×							Java
61. C. (C.) ponapensis*							×				
62. Stenochironomus sabroskyi*			×								
63. Stictochironomus townesi*								×			
64. Phaenopsectra gressitti*		G		×				×	×		

Distribution of Micronesian Chironomidae

	Micronesian Island Groups										Other Localities
			Caroline								
	Bonin	S. Mariana	Palau	Yap	Caroline Atolls	Truk	Ponape	Kusaie	Marshall	Gilbert	
65. Polypedilum (Polypedilum) concomitatus			×								Java
66. P. (P.) albiceps	×		×								Java, Bali
67. P. (P.) perturbans		G									Sumatra
68. P. (P.) ponapensis*							×				
69. P. (P.) insulanus*						×					
70. P. (P.) dybasi*			×	×			×	×			
71. P. (P.) medivittatus*		G	×	×			×				
72. P. (P.) nigribasalis*			×	×			×				
73. P. (P.) longilobatus*						×					
74. P. (P.) spadix*			×	×							
75. P. (P.) albicorpus*			×								
76. P. (P.) yapensis*			×	×							
77. P. (Pentapedilum) convexum			×				×				Sumatra
78. P. (P.) nodosum		×	×	×		×					Sumatra, Java
79. P. (P.) esakii		G						×			
80. P. (P.) elongatus*						×					
81. P. (P.) palauensis*			×								
82. P. (P.) trukensis*			×			×					
83. Tanytarsus (Tanytarsus) ovatus			×								Java
84. T. (T.) boninensis*	×	G									
85. T. (T.) lamnicaudus*			×	×		×		×			
86. T. (T.) dybasi*		×	×	×	×			×			
87. T. (T.) halophilae		×	×	×	×	×		×	×		Samoa
88. T. (T.) ponapensis*			×			×	×				
89. T. (T.) simplex*			×				×				
90. T. (T.) pelagicus			×								Japan
91. T. (T.) insulicolus*		G	×								
92. T. (T.) magnihamatus		G	×	×		×			×		Japan
93. T. (T.) maritimus			×		×	×					Samoa
94. T. (T.) latiforceps*			×								
95. T. (T.) brachyurus*			×								
96. T. (T.) tricuspis*			×								
97. T. (T.) esakii			×	×	×	×		×	×		
98. T. (Stempellina) emarginatus*			×								
99. T. (S.) gressitti*			×	×							
100. Pontomyia oceana*			×								

Chironominae mid and hind tibiae each with a pair of combs usually associated with spurs and fore tibia shorter than basitarsus. Wings with vein R trifurcate into R_1, R_{2+3}, and R_{4+5} almost at same point (in Tanypodinae R_{2+3} bifurcate at tip), M bifurcate into M_{1+2} and M_{3+4}, but base of M_{3+4} atrophied in Orthocladiinae, Chironominae, Corynoneurinae, and Clunioninae; M_{1+2} connected to base of R_{4+5} by cross vein r-m; M_{3+4} connected to Cu_1 by cross vein m-cu or anastomosed with Cu_1 in Tanypodinae, Podonominae, and Diamesinae. Abdomen with nine distinct segments. In all subfamilies except Chironominae, male hypopygium with styles able to bend forward and lie against inner margins of coxites and bearing apical spine; in Chironominae styles projecting rigidly backward and without apical spines; coxites of male hypopygium carrying one or two mesal lobes in Orthocladiinae and two or three in Chironominae. Females with last segment bearing a pair of leaflike cerci; last sternite (subgenital sternite) somewhat modified and usually with caudal incision; spermathecae usually two and equal in shape and size.

Key to Subfamilies of Chironomidae

1. Base of M_{3+4} present....................2
   Base of M_{3+4} absent....................4

2(1). Postscutellum lacking median keel or furrow; R_{2+3} completely absent, R_1 and R_{4+5} widely separated....................**Podonominae***
   Postscutellum with well-developed median keel or furrow; R_{2+3} present....................3

3(2). R_{2+3} forked (in some small species hidden by dense hairs and close approximation of R_1 and R_{4+5})....................**Tanypodinae**
   R_{2+3} simple and always distinct (wings usually bare)....................**Diamesinae***

4(1). LR nearly always more than 1.0; fore tibial spur reduced; tibial combs composed of short, basally fused spinules; male styles always rigidly directed backward....................**Chironominae**
   LR less than 1.0; fore tibia with spur; tibial combs not composed of short, basally fused spinules; male styles folded mesad against coxite....................5

5(4). R_{4+5} completely or almost completely fused with thickened costa to form a "clavus" and with a false vein running close to anterior margin on outer half of wing....................**Corynoneurinae***
   R_{4+5} not fused with thickened costa and without such a false vein along anterior margin of wing....................6

6(5). Pronotum scarcely divided on mid-dorsal line; anepisternal suture well developed; male antennae normally plumose....................**Orthocladiinae**
   Pronotum widely separated into lateral lobes; anepisternal suture obsolete; male antennae not plumose....................**Clunioninae**

* Not recorded from Micronesia.

Subfamily TANYPODINAE

Synonym: Pelopiinae.

Wing vein M_{3+4} with basal section not atrophied and veins M_{3+4} and Cu_1 connected by cross vein m-cu or their anastomosis, R_{2+3} normally present, forked apically and R_3 ending at tip of R_1, sometimes more or less atrophied or difficult to see, but in these cases wings densely hairy. Male antennae 15-segmented, last segment at apex of greatly elongated penultimate; female antenna 12- to 15-segmented. Male hypopygium usually without well-developed basal appendages or coxite lobes, styles infolded and with distinct terminal spine.

Larvae aquatic and carnivorous, feeding mostly on other chironomid larvae.

Key to Genera of Tanypodinae

1. Tarsal segment 4 bilobate or cordiform; wing membrane without macrotrichia......2
   All tarsal segments cylindrical; macrotrichia present on wing membrane, except in *Procladius* (*Psilotanypus*)......3
2. Wing with fMCu distal to end of basal section of M_{3+4}; scutum usually without central oval tubercle......**Clinotanypus**
   Wing with fMCu at end of basal section of M_{3+4}; scutum always with central oval tubercle......**Coelotanypus***
3. Wing with fMCu distal to end of basal section of M_{3+4}; m-cu absent......**Tanypus*** and **Procladius***
   Wing with fMCu basad to end of basal section of M_{3+4}; m-cu present......4
4. Female antennae 11- to 13-segmented; wing with costa ending before or only a little beyond tip of R_{4+5}; smaller species......**Pentaneura**
   Female antennae 15-segmented; wing with costa always ending distinctly beyond apex of R_{4+5}; larger species......**Anatopynia**

* Not recorded from Micronesia.

Genus **Clinotanypus** Kieffer

Clinotanypus Kieffer, 1913, Indian Mus., Rec. **9**: 157.—Kieffer, 1923, Soc. Ent. France, Ann. **92**: 186.—Goetghebuer, 1927, Faune France, **15**: 28.—Edwards, 1929, Ent. Soc. London, Trans. **77**: 302.—Goetghebuer, 1935, Rev. Zool. Bot. Afr. **27**: 351.—Goetghebuer, 1936, IN Lindner, Flieg. Palaearkt. Reg. **136**: 4.—Johannsen, 1952, Conn. Geol. Nat. Hist. Surv. Bull. **80**: 11.

Wings bare, costa produced beyond tip of R_{4+5}, R_{2+3} forked apically, but base of R_2 atrophied or nearly so, m-cu absent and M_{3+4} and Cu_1 anastomosed for long distance before fMCu. Female antennae 14-segmented. Penultimate tarsal segment bilobate and cordiform.

1. **Clinotanypus guamensis** Tokunaga, n. sp. (fig. 1, *a*).

Large black shiny species; legs white-banded, wing with large dark spot on apical fourth. Thorax black, with entire scutum very shiny, legs dark, but trochanters and femoral bases brown, all tibiae with preapical white bands, tarsi mainly white but apical two or four segments brown.

Female: Body 3.12-4.29 mm. long; wings about 2.0 mm. by 0.79 mm. Head with vertex brown, frons yellowish brown, mouthparts dark brown, eyes separated by half of length of eye; palp five-segmented (20: 27: 47: 60: 77), with segments 1 and 5 pale brown and other segments dark brown; antenna 14-segmented, with scape yellow, following six segments white, apical segments gradually turning brown, segment 2 constricted suggesting two segments, intermediate flagellar segments round or oval, RL-A 18: 16: 8: 8: 9: 10: 10: 11: 12: 12: 12: 13: 14: 40. Thorax entirely black, scutum strongly shiny, without bristles or tubercle, pleuron and sternum dark brown, scutellum setigerous. Legs mainly dark, trochanters and femoral bases brown, tibiae with extreme bases pale brown, and with distinct, white, preapical bands, band of fore tibia large and about one-half length of segment, band of mid tibia very small and only one-seventh of segment, band of hind tibia about one-third of segment; tarsi bicolored, white and brown, fore basitarsus mainly white and with apical end brown, other four

segments entirely brown, in other legs basal three segments white, apical two segments and apical end of segment 3 brown; basal three tarsal segments of mid leg with double apical spines, those of hind leg with single spine, LR about 0.66, RL-FT 75: 85. Wing (fig. 1, *a*) broad basally, with anal lobe large, macrotrichia absent on membrane, R and R_1 setigerous, basal three-fourths fumose, large dark spot at apical one-fourth, apical part of wing quite clear, fR and r-m dark; RL-V 55.5: 45.5: 73.5: 46, R_{2+3} formed at tip, r-m longer than basal section of M_{3+4}, shorter than apical projection of costa. Halter brown. Abdomen with tergites black, sternites dark brown, cercus dark or pale brown.

Male: Unknown.

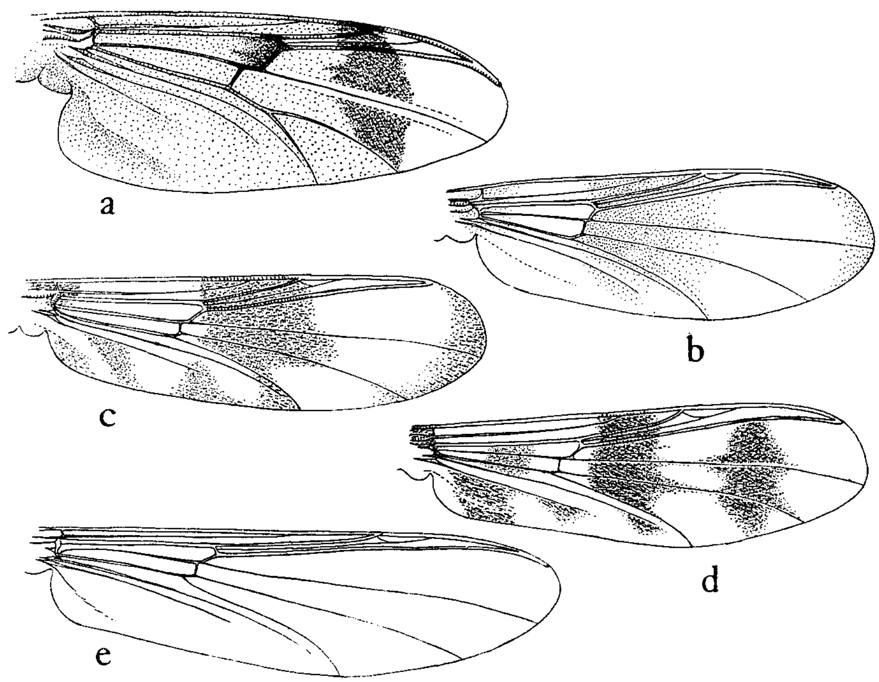


FIGURE 1.—Wings of Tanypodinae: **a**, *Clinotanypus guamensis*, female; **b**, *Pentaneura delosa*, female; **c**, *P. carolinensis*, male; **d**, *P. ignobilis*, male; **e**, *Anatopynia elongata*, female.

Holotype, female (US 66529), Guam, Feb. 27, 1938, Oakley. Paratopotype, female, June 17, 1939, Oakley. Other specimens: Guam: 29 females, Apr. 1937-Oct. 8, 1938, Oakley.

DISTRIBUTION: S. Mariana Is. (Guam).

Similar to *C. rugosus* Freeman from Africa, but easily distinguished by the entirely shiny scutum; in *rugosus* the caudoscutal area is distinctly rugose.

Genus **Pentaneura** Philippi

Pentaneura Philippi, 1865, Zool.-Bot. Ges. Wien, Verhandl. **15**: 629.—Edwards, 1929, Ent. Soc. London, Trans. **77**: 287.—Johannsen, 1946, New York Ent. Soc., Jour. **54**: 267.—Freeman, 1953, Roy. Ent. Soc. London, Proc. B, **22**: 127; 1955, British Mus. (N.H.) Ent. Bull. **4**: 20.

Isoplastus Skuse, 1889, Linn. Soc. New South Wales, Proc. **4**: 279.

Ablabesmyia Johannsen, 1905, New York State Mus., Bull. **86**: 135.—Goetghebuer, 1935, Rev. Zool. Bot. Afr., **27**: 356; 1936, IN Lindner, Flieg. Palaearkt. Reg. **13**, b: 24.

Tanypus (Meigen), Kieffer, 1923, Soc. Ent. France, Ann. **92**: 192.—Goetghebuer, 1927, Faune France, **15**: 46.

Wings densely hairy; costa not or only very slightly produced beyond tip of R_{4+5}, R_2 normally present usually, m-cu present, although very short; antennae of female with 11 to 13 segments; pronotum more reduced than in other genera of the subfamily; no tarsal spurs; pulvilli absent.

Key to Subgenera of Pentaneura

Tibiae without black rings, at most dark or brown markings on knees; caudoscutal area not well defined, acrostichal setae running across it; male hypopygium usually without basal aedeagal structures, style with spine on apical end .... **Pentaneura**

Tibiae with three or four well-defined black rings; caudoscutal area sharply defined, more or less circular, acrostichal setae diverging around it; male hypopygium always with complex aedeagal structures, style with preapical spine .... **Ablabesmyia**

Subgenus **Pentaneura** Philippi

Pentaneura Philippi, 1865, Zool.-Bot. Ges. Wien, Verhandl. **15**: 629.—Edwards, 1929, Ent. Soc. London, Trans. **77**: 287 (groups B-F).—Johannsen, 1946, New York Ent. Soc., Jour. **54**: 267 (groups B-F).—Freeman, 1955, British Mus. (N.H.), Ent. Bull. **4**: 20.

Isoplastus Skuse, 1889.—Kieffer, 1911, Linn. Soc. London, Trans. **14**: 364.

Ablabesmyia Johannsen, 1905, New York State Mus., Bull. **86**: 135 (in part).—Goetghebuer, 1935, Rev. Zool. Bot. Afr. **27**: 356 (in part).

Nilotanypus Kieffer, 1923, Soc. Ent. France, Ann. **92**: 191.

Psectrotanypus Kieffer, 1923, Soc. Ent. France, Ann. **92**: 202.—Goetghebuer, 1927, Faune France, **15**: 31; IN Lindner, 1936, Flieg. Palaearkt. Reg. 13, b: 17.

Key to Micronesian Species of Subgenus Pentaneura

1. Wings without markings; thorax, including postscutellum, uniformly yellowish white .... **2. ponapensis**
   Wings with at least faint, ill-defined markings; thorax at least with brownish postscutellum 2
2. Wings with three incomplete bands of fuscus macrotrichia; third band preapical .... **3. ignobilis**
   Wings with one or two bands of fuscus macrotrichia; apical band along distal margin of wing 3
3. Coxite of male hypopygium with basal setigerous lobe round; female, with last antennal segment not constricted before middle, scutellum with more than 10 caudal bristles .... **4. delosa**
   Coxite of male hypopygium with basal setigerous lobe subtriangular; female with last antennal segment constricted before middle, scutellum with less than 10 caudal bristles .... **5. carolinensis**

2. Pentaneura (Pentaneura) ponapensis Tokunaga, n. sp. (fig. 2, *d*).

Large, entirely white or pale-yellowish species; no thoracic vittae, wing marking, leg bands, or abdominal bands. AR 0.96-1.24, female antenna 12-segmented, LR 0.83 in male and 0.75 in female.

Male: Body 3.02 (2.44-3.38) mm. long; wings 1.75 (1.5-1.94) mm. by 0.48 (0.43-0.52) mm. Almost entirely white; head very pale yellow, eyes separated above by width of three to six facets; palp five-segmented (13: 20: 38: 47: 90); antenna with scape pale yellow, flagellum and plumose hairs pale brown, AR 1.14 (0.96-1.24). Thorax entirely white, scutellum with 10 to 14 bristles along caudal margin and 10 to 20 small setae scattered on anterior part. Legs entirely white, LR 0.83 (0.82-0.84), RL of femur and tibia about 63.3: 74 in fore leg, 66.4: 61 in mid leg, and 59.6: 79.3 in hind leg. Wing entirely white, but radial and costal hairs slightly yellowish, fork of R_{2+3} indistinct, costa very slightly produced beyond tip of R_{4+5} as long as basal section of M_{3+4}, RL-V 42.4: 34: 69: 37.3. Halter white. Abdomen white, hypopygium (fig. 2, *d*) with coxite long, subcylindrical, slightly tapered, about 2.5 times as long as basal width, with basal swelling very low, style five-sevenths to three-fifths of length of coxite, distinctly tapered, sharply pointed, almost straight and with scattered small setae basad.

Female: Body about 3.06 mm. long; wings about 2.11 mm. by 0.69 mm. Somewhat more yellowish than male. Palp five-segmented (15: 15: 50: 57: 95); antenna 12-segmented, with scape yellow, flagellum mainly white, but distal margins or neck parts of intermediate flagellar segments pale yellow, last segment pale yellow and basally white, tapered, rather pointed; RL-A 19: 34: 19: 19: 20: 21: 22 . . . 22: 23: 40. Thorax entirely white; legs entirely yellowish white. LR about 0.75, RL of femur and tibia about 78: 93 in fore, 80: 81 in middle and 77: 100 in hind leg. Wing with RL-V 43: 47.5: 99: 40. Abdomen yellow, cercus very pale yellow, three hyaline spermathecae.

Holotype, male (US 66530), NW. slope, Mt. Nahnalaud, Ponape, Mar. 19, 1948, Dybas. Allotype, female (US), Mt. Temwetemwensekir, Ponape, June-Sept. 1950, Adams. Paratypes (BISHOP, CM, US), male, same data as for holotype; male, between Nanipil and Mt. Pairot, Net District, Ponape, Mar. 14, 1948, Dybas; male, Mt. Dolen Nankep, Ponape, Aug. 13, 1946, Townes; female, male, Mwot, Kusaie, light trap, Apr. 10, 1953, Clarke.

DISTRIBUTION: E. Caroline Is. (Ponape, Kusaie).

P. ponapensis is very similar to an unnamed Johannsen species from Java from which it can be separated by the absence of the brownish tergal spots of the abdomen. *P. okadai* Tokunaga (Japan) is also closely allied, but may be separated by the slightly different values of AR and LR, the reddish-brown scutal vittae and the slightly more arcuate style of the male hypopygium. *P. binotatus* Wiedemann (Europe) is another allied species, but may be separated by the two dark basal bands on the posterior abdominal tergites. *Ablabesmyia flavidella* Kieffer and *A. ensigera* Kieffer (Bohemia) are also allied to the present species, but in the female of *flavidella* the last antennal segment is three times as long as the penultimate, and in the male of *ensigera* the hind tibial spur is exceedingly long and the style is more slender than the new species.

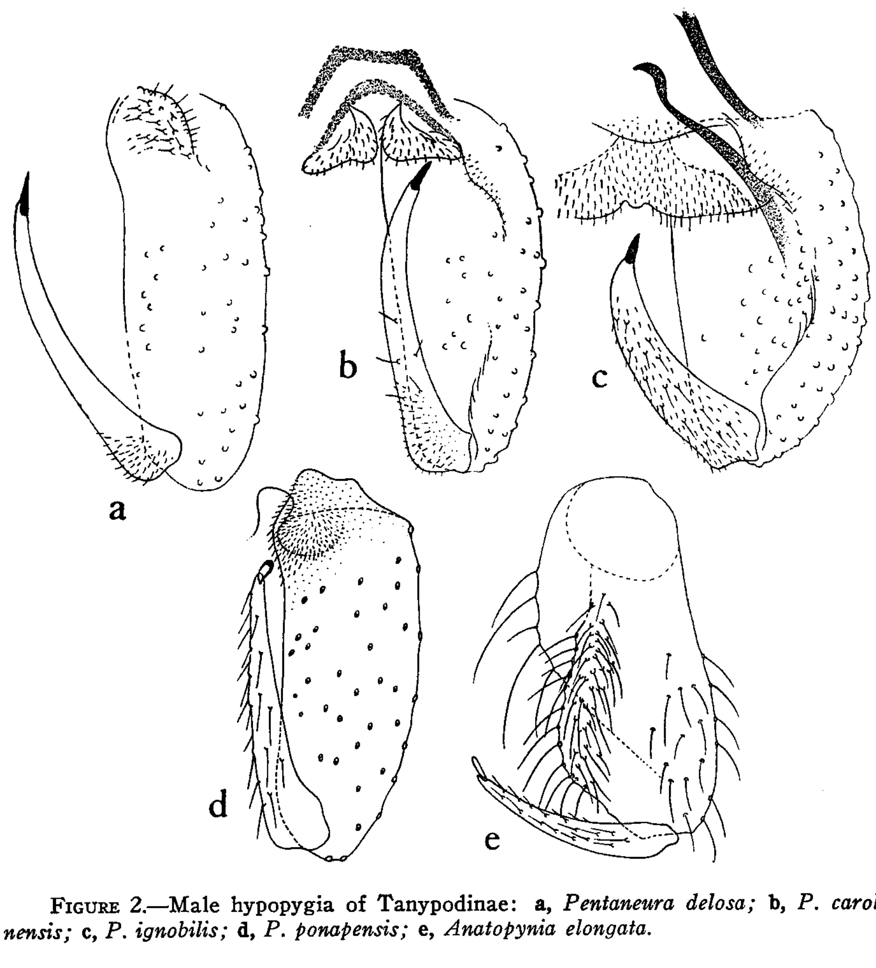


FIGURE 2.—Male hypopygia of Tanypodinae: a, *Pentaneura delosa;* b, *P. carolinensis;* c, *P. ignobilis;* d, *P. ponapensis;* e, *Anatopynia elongata.*

3. Pentaneura (Pentaneura) ignobilis Johannsen (figs. 1, *d*; 2, *c*).

Pentaneura ignobilis Johannsen, 1931, Archiv Hydrobiol. suppl. 9, Tropische Binnengewässer 2: 496.

Medium-sized yellowish brown species, with apical one-fifth of mid and hind femora dark, LR about 0.85, wing fasciated by three distinct fuscus clouds, abdomen pale brown, but more distinctly brown posteriorly, with median fuscus tergal stripe.

Male: Body about 2.99 mm. long; wings 1.82 mm. by 0.52 mm. Head yellowish brown, mouthparts dark, eyes separated by 0.43 length of eye; palp five-segmented (15: 17: 58: 56: 87); antenna with scape yellowish brown, flagellum brown. Thorax mainly pale yellowish brown; scutum yellow, but caudoscutal and humeral areas white; scutellum fuscus yellow, with 11 bristles and many small setae; postscutellum with pair of brown spots. Legs bicolored: Fore coxa pale yellowish brown, mid and hind coxae and all trochanters brown; femora yellowish, but apical one-fifth of mid and hind legs dark; tibiae and tarsi entirely white; hind tibial comb indistinct; LR 0.85, RL-FT 68: 74. Wing (fig. 1, *d*) with veins pale yellow, with fuscus spots of hairs, R_1 ending above tip of Cu_1, RL-V 41: 40: 80: 34; basal spot covering middle parts of R, M, and stem of fMCu, median bandlike spot arising from costa, ending on middle part of Cu_1, covering subbasal parts of radial and median branches of veins and separated from fR, r-m, basal section of M_{3+4}, and m-cu, preapical spot transverse at apical fourth of wing. Halter with stem yellow, knob pale brown. Abdomen very pale brown basally and darker brown posteriorly; tergites 2 to 6 with common median fuscus stripe and each with median group of dark setae; tergites 7 to 8 almost entirely setigerous and uniformly dark; hypopygium (fig. 2, *c*) with tergite 9 and style pale; coxite dark, rather broad, oblong; style about three-fourths as long as coxite, slightly arcuate, not very slender, tapered, with scattered small setae.

DISTRIBUTION: Sumatra, Caroline Is. (Kusaie).

KUSAIE. Male, Hill 1010, 300 m., light trap, Apr. 1953, Clarke.

The original description is supplemented by additional characters of a male from Kusaie. This specimen is slightly different from the type in that the femora are basally paler and the scutum is much paler.

4. Pentaneura (Pentaneura) delosa Johannsen (figs. 1, *b*; 2, *a*).

Pentaneura delosa Johannsen, 1931, Archiv Hydrobiol., suppl. 9, Tropische Binnengewässer 2: 500.

Small, yellow species, thorax without distinct colored marking, legs almost entirely pale brownish yellow, but in darker specimens mid and hind femora obscurely fuscus on apical one-fifth; wing with very faint fuscus bandlike markings; basal small one covering arculus, median broad one arising from level of r-m and fading out before that of tip of Cu_1, apical narrow one along wing tip; abdomen mainly yellow, in male, tergites 3, 4, and 6 with broad, pale-brown, basal bands, tergite 7 with narrow caudal band, tergite 8 almost entirely pale brown; in female, tergites with only median small brownish clouds. AR 1.51, female antenna 12-segmented; LR 0.92; wing with costa not produced beyond end of R_{4+5} and ending slightly before tip of M_{1+2}.

Male: Body about 2.89 mm. long; wings about 1.61 mm. by 0.42 mm. Head almost entirely yellowish pale brown, with eyes widely separated above for distance of 0.4 length of eye; palp very pale; antenna with scape yellowish pale brown, flagellum and plumose hairs brown or pale brown, AR 1.51, RL-A8 8.5: 8.5: 8.5: 8.5: 8: 8: 140: 17. Thorax almost entirely yellowish pale brown, scutum without distinct colored marking, postscutellum yellowish brown, scutellum with 10 bristles and 15 minute hairs. Legs almost entirely pale brownish yellow, hind tibial comb with seven teeth, RL-FT

52: 57, tarsi missing. Wing slender, very pale brown including veins, with ill-defined faint clouds on arculus, middle part and wing tip, R_{2+3} forked, r-m hardly as long as m-cu (3: 4), RL-V 36: 35: 65: 33 + 3; halter white. Abdomen mainly yellow, tergites 1 and 2 with faint lateral fuscus clouds, 3 and 4 with basal broad pale-brown bands, 6 with very broad basal band, 7 with broad caudal band, 8 mainly brownish; hypopygium (fig. 2, *a*) yellowish white, coxite long, cylindrical and with finely setigerous, low basal swelling, style very slender, tapered, slightly arcuate, slightly shorter than coxite.

Female: Body 1.56-1.77 mm. long; wing 1.26-1.35 mm. by 0.44 mm. Distinctly smaller than male, abdomen paler than in male. Head with eyes separated above by one-third length of eye; palp five-segmented (12: 16: 47: 56: 80); antenna with scape pale yellow, flagellum very pale brown, 12-segmented, RL-A 17: 18: 12: 12: 13: 13: 13: 13.5: 13.5: 13.5: 14: 28. Thorax largely pale brownish yellow or very pale brown, scutum with humeral and caudoscutal area almost white, but faint, pale-brown clouds on anterior margin and behind humeral areas, scutellum and postscutellum more brownish, scutellum with 10 to 12 bristles and many small setae. Leg entirely yellowish pale brown, but fore coxa and trochanter fuscus yellow, mid and hind femora pale brownish and with apical one-fifth faintly fuscus, RL-FT 48: 47.5, LR 0.92. Wing (fig. 1, *b*) far broader than in male, r-m as long as m-cu, RL-V 26: 33: 63: 23 + 2. Abdomen yellowish pale brown, tergites 2 to 7 with median ill-defined faint brownish spots.

DISTRIBUTION: Sumatra, Caroline Is.

PALAU. BABELTHUAP: Eight females, four males, Ulimang, Dec. 1947, Dybas.

YAP. YAP: Male, near Yaptown, July 1946, Townes; female, Oct. 1952, Krauss.

PONAPE. Female, Nanpohnmal, air field, June-Sept. 1950, Adams.

The original description of Javanese specimens of *P. delosa* differs from the present one in minor points of coloration of the legs.

5. **Pentaneura (Pentaneura) carolinensis** Tokunaga, n. sp. (figs. 1, *c*; 2, *b*).

Small yellowish species very similar to *delosa* in general appearance, but fuscus or brown markings more distinct and wings with more small clouds. Scutum with small, slightly fuscus clouds on anterior margin and behind humeral areas, scutellum and postscutellum fuscus or darker; legs largely very pale, but femora with apical part dark, preapical part broadly white, basal half uniformly pale brown or yellowish basally and brownish sub-basally; wing with median cloud contiguous with r-m but apart from basal part of M_{3+4} and m-cu, small clouds in anal cell; abdomen with fuscus bands and spots as in male *delosa,* but almost entirely pale in female. AR 1.4-1.58, female antenna 12-segmented and with last segment slightly constricted before middle and as long as preceding two together; male hypopygium also as in *delosa,* but basal swelling of coxite more prominent, subtriangular.

Male: Body 2.6-2.86 mm. long; wing 1.54 (1.5-1.6) mm. by 0.42 (0.4-0.43) mm. Head fuscus yellow or pale brown, with face and mouthparts yellowish white, eyes separated above by width of three to six facets; palp five-segmented (11.7: 15.3: 41: 54.7: 63.3); antenna with scape fuscus yellow, flagellum and plumose hairs dark brown, 15-segmented, AR 1.46 (1.4-1.58), RL-A 26: 10.5: 5: 7.5: 9 . . . 9: 8.8: 8.8: 8.5: 122.5: 18. Thorax mainly yellow or pale brownish yellow, slightly fuscus on pleural and sternal sclerites, scutum with three fuscus clouds on anterior margin and humeral parts, scutellum fuscus yellow, postscutellum fuscus yellow or dark brown, scutellum with nine to ten very strong bristles along caudal margin and many minute setae concentrated on median part. Legs with all coxae slightly fuscus yellow, but fore coxa more brown-

ish, trochanters pale brownish yellow, femora with apical one-fifth dark, preapical one-fourth pale brownish yellow, basal half fuscus pale brown and sometimes basal one-fifth yellowish pale brown, all tibiae pale yellow, tarsi slightly brownish; RL-FT 53.3: 54: 3, hind tibial comb with six teeth, fore tarsi missing. Wing (fig. 1, *c*) with fuscus clouds: small one covering arculus, median broad one arising from costa, covering basal half of R_1, fR, r-m, sub-basal part of M_{3+4} and apical half of Cu_1, apical one along apical margins of cells R_5 and M_2, small clouds on basal and preapical parts of anal cell; r-m longer than m-cu and first section of M_{3+4}, RL-V 33.5: 29: 57: 29; halter white. Abdomen mainly yellow, tergites 1 to 2 with lateral brown spots, 3 to 4 with broad basal brown bands, 6 with very pale broad basal band, 7 with faint lateral brown clouds, 8 entirely brown, these spots and bands often much faded; hypopygium (fig. 2, *b*) yellow, coxite long, cylindrical, with basal swelling subtriangular and pubescent, style almost as long as coxite, very slender and tapered.

Female: Body 1.82 mm. long; wings 1.6 mm. by 0.5 mm. Coloration far paler than in male. Palp 5-segmented (13: 20: 40: 62: 80); antenna almost entirely yellow, last segment pale brown and subconstricted subbasally, 12-segmented, RL-A 15: 22: 14: 14: 15 . . . 15: 14: 14: 15: 18: 32. Thorax with fuscus and brown marking very obscure. Legs very pale brown, all femora apically dark, other femoral bands very faint, tarsi missing, RL-FT 57: 63, hind tibial comb with six teeth. Wing with clouds faint, RL-V 30: 35: 66: 23. Abdomen almost entirely yellow, fuscus spots almost absent.

Holotype, male (US 66531), Agric. Expt. Sta., Ponape, June-Sept. 1950, Adams. Allotype, female (US), Dededo, Guam, July 8, 1938, Oakley. Paratypes (BISHOP, US, MCZ), 29 males, data same as for holotype; male, near Yaptown, Yap, July 14, 1946, Townes; male, Nanpohnmal, air field, Ponape, June-Sept. 1950, Adams. Other specimens: Guam: Female, data same as for allotype. Palau: Male, Koror I., at light, Sept. 1952, Beardsley. Ponape: Male, Mt. Dolen Nankep, Ponape, Aug. 11, 1946, Townes.

DISTRIBUTION: S. Mariana Is. (Guam), Caroline Is. (Palau, Ponape, Yap).

This species is similar to *delosa,* but easily distinguished by the more distinct wing marking and the characteristic femoral coloration. *P. solita* Johannsen (Bali), described from a single female, seems to be closely allied to this species in general appearance, but the wings, 2.2 mm., are much longer. *P. woodi* Edwards (Britain) is also similar to *carolinensis* but differs in the arrangement of the abdominal bands and the position of the clouds of the wing. *Psectrotanypus trifascipennis* Zetterstedt has similar wing markings, but the style of the male hypopygium is distinctly different.

Subgenus **Ablabesmyia** Johannsen

Isoplastus Skuse, 1889, Linn. Soc. New South Wales, Proc. **4**: 279.

Ablabesmyia Johannsen, 1905, New York State Mus. Bull. **86**: 135 (in part). —Goetghebuer, 1935, Rev. Zool. Bot. Afr. **27**: 356 (in part).—Freeman, 1955, British Mus. (N.H.) Ent. Bull. **4**.—Roback, 1959, Am. Ent. Soc., Trans. **85**: 113.

Tanypus Meigen; Kieffer, 1923, Soc. Ent. France, Ann. **92**: 192.

Pentaneura (group A), Edwards, 1929, Ent. Soc. London, Trans. **77**.—Johannsen, 1946, New York Ent. Soc., Jour. **54**.

Pentaneura, Freeman, 1953, Roy. Ent. Soc. London, Proc. B, 22 (in part).

Male hypopygium with preapical spine of style and true apex of style flattened, fluted and often expanded disclike or trumpetlike. For other subgeneric characters see key, p. 494.

The specific characters and phylogenetic relationships of subgenus *Ablabesmyia* were discussed in detail by Roback (1959).

6. Pentaneura (Ablabesmyia) monilis (Linnaeus).

Tipula monilis Linnaeus, 1758, Syst. Nat. **10**: 587.

Tanypus monilis, Kieffer, 1919, Mus. Nat. Hungarici, Ann. **17**: 153.—Kieffer, 1921, Philippine Jour. Sci. **18**: 574; 1922, Soc. Linn. Lyon, Ann. **69**: 41.—Goetghebuer, 1927, Faune France, **15**: 47.

Pentaneura monilis, Edwards, 1929, Ent. Soc. London, Trans. **77**: 289.—Tokunaga, 1937, Fauna Nipponica **10**: 87; 1937, Philippine Jour. Sci. **62**: 44.—Johannsen, 1952, State Conn. Geol. Nat. Hist. Surv. Bull. **80**: 6.

Pentaneura (*Ablablesmyia*) *monilis,* Roback, 1959, Am. Ent. Soc., Trans. **85**: 128.

As specific characters of *monilis* were given in detail by Roback (1959), they need not be repeated here.

DISTRIBUTION: Europe, North America, Formosa, Sumatra, Asia Minor, Central Asia, Japan, Caroline Is.

TRUK. WENA (Moen): Six females, male, Mt. Chukumong, 80 m., light trap, Dec. 1946, male, July 1946, Townes. TON: two males, Mt. Unibot, native forest, light trap, Jan. 1953, Gressitt.

Genus **Anatopynia** Johannsen

Anatopynia Johannsen, 1905, New York State Mus. Bull. **86**: 135.—Edwards, 1929, Ent. Soc. London, Trans. **77**: 297.—Johannsen, 1952, Conn. State Geol. Nat. Hist. Surv. Bull. **80**: 9.—Freeman, 1955, British Mus. (N.H.) Ent. Bull. **4**: 44.

Psectrotanypus Kieffer, 1909, Soc. Metz, Bull. **26, 42** (*nec* Kieffer, 1923, Soc. Ent. France, Ann. 92: 202).—Goetghebuer, Faune France **15**: 31.

Macropelopia Thienemann, 1916, Archiv Hydrobiol. Suppl. 2: 497.—Goetghebuer, 1927, Faune France **15**: 36; IN Lindner, 1936, Flieg. Palaearkt. Reg. **136**: 18.

Wings more or less hairy; costa very distinctly produced beyond tip of R_{4+5}, R_2 always present and distinct, r-m very short. Antennae of female 15-segmented; first two tarsal segments of hind leg with minute apical spurs; pulvilli present or absent.

Key to Micronesian Species of Anatopynia

Dark-brown species. In female, penultimate antennal segment as long as preceding one; postscutellum setigerous with 10 or more setae.................................7. **boninensis**

Yellowish-brown species. In female, penultimate antennal segment far longer than preceding one; postscutellum bare or with only two setae..........................8. **elongata**

7. **Anatopynia boninensis** Tokunaga, n. sp.

Large brown or dark-brown species with dark hairs, wings without spots or clouding; female antenna 15-segmented, scutum more or less brownish and with four vittae, browner but indistinct, scutellum with small setae concentrated on median part, postscutellum with 10 or more setae on middle part, LR about 0.72, pulvilli almost absent, wing with costa projecting beyond tip of R_{4+5} ending at about basal one-third to tip of M_{1+2}, r-m about twice length of first section of M_{3+4}.

Female: Body about 3.51 mm. long; wing about 2.55 mm. by 0.79 mm. Head entirely dark brown, eyes separated above by width of seven facets; palp five-segmented (20: 20: 47: 70: 90); antenna 15-segmented, with scape yellowish brown, other segments dark brown, RL-A about 15: 17: 10: 12: 12: 12.5: 12: 11.5: 12: . . . 12: 13: 37, last segment oblong and with small terminal styletlike projection. Thorax almost entirely brown, with four scutal vittae browner but indistinct, scutellum with about 18 bristles along caudal margin and 17 setae concentrated at middle, postscutellum with about 11 bristles at middle. Legs with coxae and tarsi brown, other segments pale brown, but all setae dark, LR about 0.72, RL of seven distal segments about 88: 106.5: 77: 39: 28: 20: 14 in fore leg, 105: 102: 65: 31: 22: 17: 13 in mid leg, and 92: 127: 87: 45: 32: 21: 14 in hind leg, pulvilli almost absent. Wing entirely fuscus pale brown, with dense dark hairs, costa distinctly produced beyond tip of R_{4+5} and reaching basal one-third of M_{1+2}, r-m about twice as long as basal section of M_{3+4}, RL-V 62: 47: 103: 48. Halter very pale brown. Abdomen brown, slightly paler than thorax, but setae all dark, cercus brown, three spermathecae, equal, spherical, pale brown, about 18 + 4 units by 19 units.

Male: Unknown.

Holotype, female (US 66532), Commanders beach, Chichi Jima, Bonin Is., Apr. 22, 1958, Snyder.

DISTRIBUTION: Bonin Is. (Chichi Jima).

This species seems to belong to Edwards' group B (*Macropelopia* Thienemann) but the wings are uniformly dark brown and have no dark central spot or other markings. It is allied to *unicolor* Freeman known from Cape Province, Africa, from which it may be rather easily distinguished by the slightly larger LR, shorter projection of the costa beyond the tip of R_{4+5} and larger size. *Macropelopia adaucta* Kieffer and *M. goetghebueri* Kieffer (Europe) are somewhat similar to *A. boninensis* in general appearance, but in both these species the last antennal segment of the female does not have verticils at the base and thus distinctly differs from *boninensis.*

8. **Anatopynia elongata** Tokunaga, n. sp. (figs. 1, *e*; 2, *e*).

Large, yellowish-brown or pale brownish-yellow species, wing without colored marking. AR about 1.85, female antenna 15-segmented, with last segment elongate oval and without terminal projection; thorax without scutal vittae, scutellum with

several small setae concentrated at middle, postscutellum with only one or two setae at middle; wing with costa produced beyond tip of R_{4+5}, as long as (in male) or longer (in female) than r-m, R_{2+3} distinctly forked at tip; abdominal tergites 2 to 7 with pale brown bands.

Male: Body about 4.17 mm. long; wings about 2.18 mm. by 0.53 mm. Generally pale brownish yellow with brown hairs. Head brownish yellow, with frons white, mouthparts pale brown, eyes separated above for distance of two-thirds length of eye; palp with five segments in RL of 15: 17: 34: 59: 70; antenna with scape fuscus yellow, flagellum brown, plumose hairs pale brown, AR 1.85, RL-A8 10: 10: 10: 10: 10: 10: 215: 26. Thorax almost entirely yellow, scutum very slightly brownish only on anterior margin behind head, scutellum pale brownish yellow, with 11 bristles along caudal margin and seven small setae concentrated at middle, postscutellum very slightly brownish only on caudal tip and with two median bristles. Legs entirely pale brownish yellow (fuscus appearance due to hairs), hind tibial comb with 10 teeth, RL-FT 90: 117, fore tarsus missing. Wing with costa ending above tip of M_{1+2}, part produced beyond tip of R_{4+5} fully as long as r-m (8.5: 7), RL-V 52: 50: 87: 41, m-cu as long as basal section of M_{3+4}. Halter pale brownish white. Abdomen very pale brown, tergites 2 to 7 with pale-brown, broad basal bands. Hypopygium (fig. 2, *e*) with tergites very pale brown; coxite elongate, tapered, with dorsal swelling highly setigerous; style slender, tapered, slightly arcuate, setigerous with small scattered setae.

Female: Wings about 2.43 mm. by 0.66 mm. Generally yellowish brown and very similar to male in general appearance. Head entirely brown, with eyes separated above by one-third length of eye; five segments of palp 20: 20: 31: 58: 76; antenna with scape brown, other segments yellowish brown, 15-segmented, all flagellar segments oval, somewhat longer than wide, RL-A 15: 20: 12: 15: 15: 15.5: 16: 16: 14: 15: . . . 15: 21: 27, last segment about 3.5 times as long as wide and blunt at tip. Thorax almost yellowish brown, scutum with humeral and caudoscutal area white, postscutellum more brownish and with two to three setae at middle. Legs entirely yellowish brown, RL-FT 93: 122, fore tarsus missing. Wing (fig. 1, *e*) elongate as in male, with veins and hairs brown, costal apical projection beyond tip of R_{4+5} far longer than r-m (12: 8), RL-V 55: 62: 106: 46. Halter with stem yellow, knob fuscus yellow.

Holotype, female (BISHOP 3367), Sumay Rd., Guam, S. Mariana Is., mangrove swamp, June 23, 1936, Usinger. Allotype, male (US), Koror I., Palau Is., at light, May 16, 1957, Sabrosky. Paratypes, female, Hill behind Yaptown, Yap I., light trap, Nov. 28, 1952, Gressitt; male, Mt. Chukumong, Wena I., Truk I., light trap, Dec. 27, 1952, Gressitt.

DISTRIBUTION: S. Mariana Is. (Guam), Caroline Is. (Palau, Yap, Truk).

This species is similar to *A. boninensis,* but it may be easily separated by the paler coloration, the less setigerous thorax and the different shape of the last segment of the female antenna. *Macropelopia subtenuis* Kieffer (Hungary) is somewhat allied to the present species, but the wing of *subtenuis* is provided with black r-m and the style of the male hypopygium is more strongly arcuate. Another allied species may be *M. borealis* Kieffer, from which the present species is easily separated by the pale postscutellum and sternum and the longer styles of the male hypopygium.

Subfamily ORTHOCLADIINAE

Synonym: Orthocladiariae.

Eyes typically reniform; seldom with dorsal narrow portion. Male antennae usually plumose and normally with 14 segments, female antennae usually with five to seven segments. Pronotum collarlike, never divided into separate lateral lobes, postscutellum with median keel or furrow distinct; anepisternal suture well marked and reaching forward almost to base of fore coxa. Fore tibia always with single distinct spur and longer than basitarsus; mid tibia usually with two short spurs, but without combs; hind tibia normally with two spurs, inner one longer, and usually with comblike structure of free spinules on inner side. True base of M_{3+4} never developed, R_{2+3} never connected to R_1 on apical part, R_{4+5} usually separated from costa. Male hypopygium not inverted, styles movable, almost always folded inward in repose and usually with single terminal spine.

Key to Genera of Orthocladiinae

1. Wing membrane with macrotrichia, at least at apex....2
   Wing membrane without macrotrichia....4
2(1). Cross vein r-m very long and oblique; male styles bifid and without apical spines; legs with small pulvilli....**Brillia*** and **Eurycnemus***
   Cross vein r-m much shorter; male styles not bifid and with single apical spine....3
3(2). Labella enormously lengthened, cohering on their inner margins to form sucking proboscis....**Rhinocladius***
   Mouth parts normal, bearing short labella....**Metriocnemus**
4(1). Mouth parts with four-segmented palp....**Trissocladius***
   Mouth parts with five-segmented palp....5
5(4). Vein R_{2+3} running very close to R_{4+5}, obsolete apically and not ending distinctly in costa....**Nanocladius**
   Vein R_{2+3} not close to R_{4+5}, ending distinctly in costa....6
6(5). Squama completely bare....7
   Squama with at least partial, usually complete, fringe of setae....9
7(6). Postscutellum without fissure; middle tibial spurs absent....**Harrisonina***
   Postscutellum with fissure; middle tibial spurs present....8
8(7). Wing membrane without microtrichia, slightly tinged with brown or purplish by transmitted light....**Smittia**
   Wing membrane with distinguishable microtrichia, at least in female, colorless by transmitted light....**Diplocladius***
9(6). Eyes pubescent....10
   Eyes bare....11
10(9). Dorsocentral hairs minute and decumbent....**Cricotopus**
   Dorsocentral hairs erect and normal....**Trichocladius*** and **Stictocladius***
11(9). Legs with penultimate tarsal segment cordiform....**Cardiocladius***
   Legs with penultimate tarsal segment cylindrical....12
12(11). Pulvilli of legs large and broad....**Psectrocladius***
   Pulvilli of legs small, narrow or absent....13
13(12). Wing membrane without microtrichia, usually brownish by transmitted light....**Orthocladius**
   Wing membrane with microtrichia, colorless by transmitted light....**Limnophyes*** and **Chaetocladius***

* Not recorded from Micronesia.

Genus **Metriocnemus** van der Wulp

Metriocnemus van der Wulp, 1874, Tijdschr. Ent. **17**: 136.—Kieffer, 1911, Linn. Soc. London, Trans. (Zool.), **14**: 360.—Edwards, 1929, Ent. Soc. London, Trans. **77**: 310.—Goetghebuer, 1932, Faune France **23**: 13; 1936, Rev. Zool. Bot. Afr. **28**: 491.—Coe, 1950, Handbook Ident. Brit. Ins. **9**: 140.—Freeman, 1956, British Mus. (N.H.) Ent. Bull. **4**: 294.

Wing with distinct macrotrichia on membrane, at least at apex; cross vein r-m rather short; eyes usually bare; pulvilli absent; scutum not produced forward, pronotum forming a distinct collar; male hypopygium with styles not bifid; hind tibia with comb as usual.

Edwards, Goetghebuer, and Coe subdivided the genus into the following subgenera: *Thienemannia* Kieffer (1909), *Metriocnemus* (sens. str.), *Heterotrissocladius* Spärck (1922), *Paraphaenocladius* Thienemann (1926), *Parametriocnemus* Goetghebuer (1932), and *Gymnometriocnemus* Goetghebuer (1932). Following the recent opinion of Freeman, for the present I am not adhering closely to these groupings.

Key to Micronesian Species of Metriocnemus

1. Body almost entirely yellow; LR larger than 0.8; anal point of male hypopygium spear-shaped............................**9. flavellus**
   Body not entirely yellow, scutum with dark to pale-brown vittae or broadly brownish and abdominal tergites more or less fuscus; LR smaller than 0.8; anal point of male hypopygium not elongate............................2
2. Male hypopygium with lobe of coxite single and style rather thickened; female spermathecae round, brown, and neck part not elongate............................**10. claggi**
   Male hypopygium with lobes of coxite double and style slender; female spermathecae oval, colorless, and neck part elongate............................**11. adjecta**

9. **Metriocnemus flavellus** Tokunaga, n. sp. (fig. 3, *a*, *d*).

Minute yellow species, thorax entirely yellow; AR 0.4-0.53, LR of fore leg 0.98-1.52 in male and 0.85-0.9 in female, that of hind leg 0.6-0.64 in both sexes; wing with costa strongly produced and ending almost at wing tip; squama quite bare; male wing very sparsely hairy only at extreme tip of cell R_5 with one to nine macrotrichia, sometimes macrotrichia of membrane absent, female wing with macrotrichia sparsely spread and bare areas along veins very broad.

Male: Body 1.55 (1.48-1.63) mm. long; wings 0.95 (0.92-0.98) mm. by 0.29 (0.28-0.29) mm. Head entirely yellow to pale brownish yellow, with eyes bare, separated above by slightly more than length of eye (16.7: 15); palp five-segmented (5: 6.3: 16.7: 15: 20.7); antenna with scape yellow, other segments and plumose hairs brown, AR 0.47 (0.4-0.53), RL-A8 about 9: 9.3: 9.3: 9.5: . . . 9.5: 48.3. Thorax entirely yellow, except slightly brownish on pleural sclerite under wing base, scutellum with two large median and two small lateral setae. Legs entirely yellow, but slightly fuscus on distal tarsal segments, pulvilli absent, LR of fore leg 1.11 (0.98-1.52) and of hind leg 0.6-0.64, RL-FT 30.8: 29.8. Wing (fig. 3, *a*) R_1 and R_{4+5} slightly upcurved, costa strongly produced beyond tip of R_{4+5} reaching about basal three-fifths to tip of M_{1+2}, R_{4+5} ending

just or slightly beyond level of tip of M_{3+4}, R_{2+3} ending on costa just before midway between tips of R_1 and R_{4+5}, fMCu under middle of R_1, Cu_1 strongly undulate, Cu_2 ending slightly beyond fMCu, 1A before it, squama quite bare, anal lobe almost absent, macrotrichia on membrane present on extreme apex of cell R_5, usually only three (none to nine), often absent, RL-V 24.7: 15.7: 31: 34. Halter white. Abdomen entirely very pale brown; hypopygium (fig. 3, *d*) yellow, anal point large, extending caudad slightly before tip of coxite, spearlike and with several minute setae before apex, coxite slender, with mesal lobe very broad, subtriangular, platelike and fringed with minute setae, style small, oval, narrowed at basis and with small dark apical spine.

Female: Body 1.37 (1.26-1.56) mm. Wings 0.84 (0.82-0.87) mm. by 0.3 (0.29-0.3) mm. Very similar to male with usual sexual differences, but wing far more hairy. Head very pale fuscus yellow; palp five-segmented (5.3: 6.3: 13.8: 14.3: 20); antennal scape

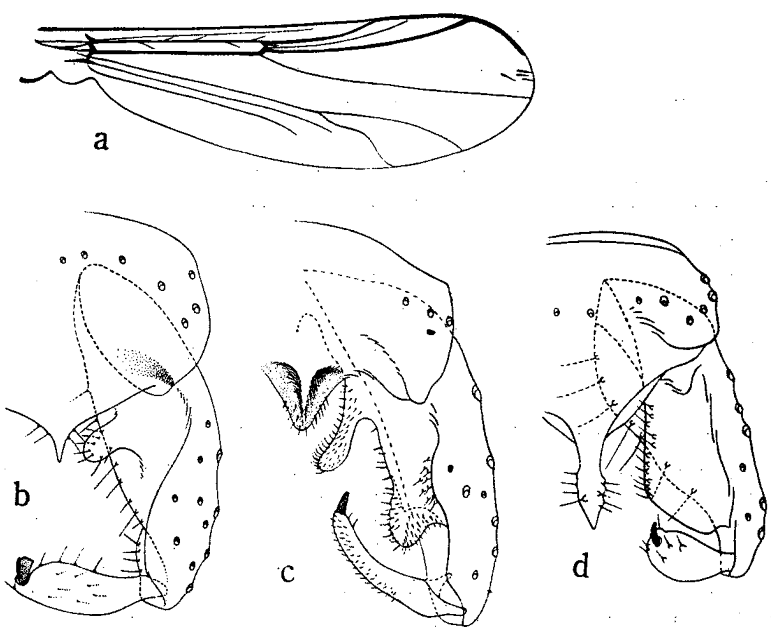


FIGURE 3.—Wing and male hypopygia: **a, d,** *Metriocnemis flavellus;* **b,** *M. claggi;* **c,** *M. adjecta.*

yellow, other segments very pale fuscus, intermediate flagellar segments elongate, flasklike, with neck parts about one-third of segments, sensillae rather long but not distinctly beyond tips of segments, six segments about 10: 17.5: 13.1: 13.3: 12.9: 18. Thorax with postscutellum very pale fuscus, scutellum with two large median and four small lateral setae. Legs with coxae, trochanters and bases of femora yellow, other parts pale brownish yellow; claw with three to four basal bristles, pulvilli absent, LR of fore leg 0.87 (0.85-0.9) and of hind leg 0.6-0.62, RL-FT 29.1: 28. Wing with veins pale fuscus brown, costa strongly produced beyond tip of R_{4+5} reaching wing tip and basal two-thirds to tip of M_{1+2}, R_{4+5} almost straight, ending beyond tip of M_{3+4}, fMCu slightly before middle of R_1, Cu_2 extending far beyond fMCu, 1A ending under fMCu; macrotrichia of membrane sparsely spread, bare areas along veins very broad and distinct, trichia between M and stem of fMCu arranged in single line above latter vein.

Abdomen mainly yellow, but tergites very slightly fuscus, pleural membrane spiculous, cercus yellow, spermathecae oval, about 4 + 16.3 units by 12.7 units, each with neck part hyaline and conical.

Holotype, male (BISHOP 3368), Agric. Exp. Sta., Colonia, Ponape, by light trap, Jan. 15, 1953, Gressitt. Allotype, female (BISHOP), Mt. Temwetemwensekir, 180 m., Ponape, light trap, Jan. 19, 1953, Gressitt. Paratypes, (US, BISHOP), female, two males, data as for holotype; male, data as for allotype; female, Colonia, Ponape, Jan. 14, 1953, Clarke; female, two males, Mt. Fuinkol, 600 m., Kusaie, Jan. 24, 1953, Gressitt.

Other specimens. Ponape: Female, 12 males, Agric. Exp. Sta., Colonia, light trap, Jan. 6-15, 1953, Gressitt; male, SE. Nanpohnmal, Jan. 8, 1953, Gressitt; female, Colonia, Jan. 14, 1953, Clarke; four females, Mt. Temwetemwensekir, 180 m., light trap, Jan. 19, 1953, Gressitt. Kusaie: Male, Mutunlik, light trap, Jan. 24, 1953, Gressitt; two females, Mwot, light trap, Apr. 10, 1953, Clarke.

DISTRIBUTION: Caroline Is. (Ponape, Kusaie).

This is somewhat allied to *M. benoiti* Freeman (Africa), from which it may be easily distinguished by the more yellowish general coloration and the distinctly characteristic shapes of the anal point and the style of the male hypopygium. Other allied species may be *mahensis* Kieffer (Seychelles) and *discretus* Johannsen (West Java), but these two allied species are easily distinguished by the fuscus abdomen and the striped scutum respectively.

10. **Metriocnemus claggi** Tokunaga, n. sp. (fig. 3, *b*).

Small species with dark and pale forms. In male of dark form, body almost entirely dark brown, of paler form mainly pale brownish fuscus and with shoulder parts of scutum pale yellow or white; in female of dark form, scutum with vittae dark brown and brown on yellow ground color, of paler form scutal vittae and other darker parts only slightly fuscus. AR 0.7-0.83, female antenna with intermediate flagellar segments flask-shaped, neck parts and sensillae rather short; thorax of male without separated scutal vittae, that of female with four separated vittae; LR of fore leg about 0.64, pulvilli absent; wing with costa strongly produced, squama without marginal fringe, anal lobe reduced, male wing with macrotrichia of membrane very sparse, only along extreme wing tip, female with macrotrichia of membrane sparsely spread and bare areas along veins broad.

Male: Body 1.83 (1.69-1.95) mm. long; wings 1.2 (1.11-1.25) mm. by 0.33 (0.3-0.34) mm. General color black or brown; in darker form, head dark, mouthparts pale brown to brown, antenna entirely dark brown, thorax almost entirely dark brown, with lateral scutal margins above wing bases, mid-dorsal line, and spots at setal bases only yellowish, legs fuscus brown, but trochanters and femoral bases yellowish or pale, wings with anterior veins pale fuscus, halter fuscus, abdomen entirely dark brown; in paler form, head with vertex dark brown, frons and mouth parts yellowish brown, antenna with scape yellowish brown, other parts dark brown, thorax mainly slightly fuscus brown, scutum with shoulder areas and lateral margins white or yellow, scutellum pale brownish yellow, legs mainly brown, wings with anterior veins very pale fuscus, halter pale brown, abdomen brown. Eyes bare, space between 1.33 length of eye; palp five-segmented (7.3: 9: 21.3: 18.7: 29.3); antenna with last segment subequal to preceding eight segments together, AR 0.79 (0.7-0.83). Scutellum with usually six and

rarely eight setae along caudal margin. Legs without pulvilli, LR of hind leg 0.63-0.64, RL-FT 39.3: 43.8. Wing with costa strongly produced beyond tip of R_{4+5} and reaching halfway to tip of M_{1+2} and as long as half of R_1, R_{4+5} just or slightly beyond tip of M_{3+4}, R_{2+3} ending on costa at middle between tips of R_1 and R_{4+5}, fMCu under middle or basal one-third of R_1, Cu_1 strongly sinuous, Cu_2 reaching middle of Cu_1, 1A ending between levels of r-m and fMCu, RL-V 32.4: 19.2: 42: 42.2, squama without marginal setae, anal lobe reduced, macrotrichia of membrane very sparse, only 0-25 and 0-12 along marginal areas of cells R_5 and M_2 respectively. Male hypopygium (fig. 3, *b*) with anal point very small, coxite slender, lobe of coxite oval, small, setigerous on ventral side and located at middle, style stout, shorter than half of coxite, with apical spine broad and probably finely serrulate at apical edge.

Female: Body 1.33 (1.3-1.39) mm. long; wings 0.92 (0.86-1.03) mm. by 0.33 (0.31-0.34) mm. In darker form, head black, but frons pale brown, mouthparts and antenna dark, thorax mainly brown, scutum with distinctly separated vittae on yellow ground color, median vittae dark brown, lateral brown, caudal and middle parts of caudoscutal area brownish, scutellum pale fuscus yellow, postscutellum dark brown, pleural membranes extensively yellow; legs fuscus pale brown, but trochanters and femoral bases yellow; wings with anterior veins fuscus pale brown, halters and abdomen fuscus pale brown. In paler form, head with vertex fuscus pale brown, frons white, mouthparts pale brown, antenna with scape yellow, other segments fuscus pale brown; thorax mainly yellowish pale brown, scutum with four vittae pale fuscus yellow on white ground color, scutellum and postscutellum pale fuscus and slightly brownish; legs almost uniformly yellowish pale brown. Other structures similar to male with some sexual differences. Eyes separated above by width of length of eye; palp five-segmented (7.3: 7.2: 15.7: 15.2: 22.3); antenna six-segmented (10.3: 19.3: 13.7: 14.3: 14.2: 20.2), segments three to five flask-shaped, each with neck part as long as one-third of segment; sensillae strong and slightly beyond tip of segment, last segment pubescent on apical half. LR of fore leg about 0.64 and of hind leg 0.58-0.6, RL-FT 29.3: 31.7. Wing with costa strongly produced beyond tip of R_{4+5} almost as long as R_1 (11: 13), reaching wing tip and basal two-thirds to tip of M_{1+2}, fMCu under middle of R_1, RL-V 21.7: 13: 33.3: 29, macrotrichia of membrane sparsely spread as in *flavellus* or sometimes more reduced, membrane between M and stem of fMCu without trichia. Abdominal pleural membrane strongly spinulous, spermathecae round, 5 + 12 units by 10 units, brown, each with hyaline conical neck part.

Holotype, male (BISHOP 3369), Futami-ko, Chichi Jima, Bonin Is., May 10, 1956, Clagg. Allotype, female (BISHOP), data same as for holotype. Paratypes (BISHOP, US, MCZ), five males, data same as for holotype; five females, Ngaremlengui, Babelthuap I., Palau, light trap, June 1, 1957, Sabrosky; female, Netkeng, Imeliik, Babelthuap I., Palau, June 5, 1957, Sabrosky; six females, Kanif, Yap I., July 30, 1950, Goss.

Other specimens. Palau: Four females Ngaremlengui, Babelthuap I., June 1, 1957, Sabrosky. Yap: Female, Gagil Distr., Yap I., July-Aug. 1950, Goss; female, S. Yap I., July 14, 1950, Goss.

DISTRIBUTION: Bonin Is. (Chichi Jima), W. Caroline Is. (Palau, Yap).

The general appearance of *M. claggi* is very similar to that of *M. brevitarsis* Edwards (Europe), of which only the female is known. *M. brevitarsis,* however, is rather easily distinguished as the LR of fore leg is only 0.35 and of the hind leg 0.5, the ultimate antennal segment is not longer or thicker than the penultimate, and is pubescent at the apex only.

11. Metriocnemus adjecta Tokunaga, n. sp. (fig. 3, *c*).

Very small yellow species, male with four separated brown scutal vitta, female with vittae yellowish brown; eyes bare, AR 0.79 (0.78-0.81), female antennal segments 3 to 4 with rather short neck part and rather long sensillae; LR of fore leg 0.62-0.66 in male and 0.57-0.6 in female, LR of hind leg 0.57-0.64 in both sexes, pulvilli absent; wing with costa slightly produced in male, strongly so in female but not reaching halfway to tip of M_{1+2}, macrotrichia of membrane very sparse only at extreme tip of cell R_5 in male and sparsely spread as in *flavellus* in female, squama quite bare.

Male: Body 1.61 (1.56-1.72) mm. long; wings 0.96 (0.92-1.0) mm. by 0.26 (0.25-0.27) mm. Generally yellow with brown scutal vittae. Head mainly yellowish brown, vertex brown, mouthparts white; eyes bare, widely separated above by 1.67 times length of eye; palp five-segmented (6: 7: 16.5: 28.5: 45.5); antenna dark brown, last segment subequal to preceding nine segments together, AR 0.79 (0.78-0.81). Thorax mainly yellow, scutum with four separated brown vittae, scutellum yellow, with four to six setae, postscutellum dark brown, other sclerites pale brown. Legs mainly yellow to yellowish brown, coxae pale brown, trochanters and femoral bases white, fore LR 0.64 (0.62-0.66), hind LR 0.6 (0.58-0.64), RL-FT 29.2: 30.9, pulvilli absent. Wing with anterior veins pale yellow, costa slightly produced beyond tip of R_{4+5} as long as one-third of R_1 or slightly longer than r-m (3.5: 2.8), ending above tip of M_{3+4} and far before wing tip, R_{2+3} ending on costa just beyond middle between apices of R_1 and R_{4+5}, slightly curved upward on apical part, fMCu under or just beyond origin of r-m, RL-V 26: 12.5: 27: 46, squama bare, anal lobe absent, usually five to six (0 to 15) macrotrichia on membrane set closely along apical margin of cell R_5. Halter white. Abdomen with tergites brown to pale brown; hypopygium (fig. 3, *c*) yellowish brown to yellow, anal point dark, triangular, and finely pubescent, coxite slender, tapered, with two lobes: sub-basal lobe slender, slightly clavate and strongly pubescent, pre-apical lobe triangular and pubescent, style slender, arcuate and slightly shorter than half of coxite.

Female: Body 1.59 (1.53-1.68) mm. long; wings 0.91 (0.86-0.95) mm. by 0.3 (0.28-0.31) mm. Generally similar to male but paler. Head mainly yellow, with vertex brown, mouth parts pale yellow, distance between eyes slightly more than length of eye; palp five-segmented (6.7: 5.7: 15.3: 26: 48.7); antenna brown, six-segmented (9.5: 16.8: 13.4: 13.9: 12.6: 18.5), segments 3 to 5 flask-shaped, with neck parts short and sensillae slender, last segment pubescent on apical half. Thorax generally yellow, scutum with three yellowish-brown vittae, caudoscutal area with inverted T-shaped fuscus cloud, shoulder parts white, postscutellum fuscus yellow, scutellum with six to seven setae, pleural side with sclerites fuscus yellow and membranes yellow, sternum yellow on middle part and slightly fuscus on lateral sides. Legs yellow, but bases of coxae fuscus, trochanters and femoral bases white, fore LR 0.58 (0.57-0.6), hind LR 0.57-0.61, RL-FT 29: 30.8. Wing with anterior veins pale fuscus, costa distinctly produced beyond tip of R_{4+5} as long as four-fifths of R_1 and ending slightly before midway to tip of M_{1+2}, R_{4+5} almost straight and ending slightly beyond tip of M_{3+4}, fMCu just before or under tip of R_1, RL-V 22.8: 10: 30.5: 33, macrotrichia of membrane sparsely spread, as in *flavellus,* bare areas along veins broad. Abdomen with tergites fuscus yellow but each tergite basally yellowish, sternites very pale brown, pleural membrane strongly spinulous with dark spicules, cerci yellow, spermathecae oval, quite hyaline, 11 to 20 units by 20 units, neck part elongate, about 2.5 times as long as wide (11: 4.5).

Holotype, male (US 66533), Ulimang, Babelthuap I., Palau, Dec. 16, 1947, Dybas. Allotype, female (US), Koror I., Palau, Sept. 1952, Krauss. Paratypes (BISHOP, US, CM, MCZ), two females, male, NE. Koror I., Palau, light trap, May 30, 1957, Sabrosky; female, Koror I., Palau, Dec. 2, 1947, Dybas; male, Koror I., Palau, July 26, 1956, McDaniel; two males, Kanif, Yap I., July-Aug. 1950, Goss; two males, Yap I., Oct. 1952, Krauss;

male, Rumung I., Yap, June 19, 1957, Sabrosky; female, male, Mt. Unibot, 32 m., Ton I., Truk, light trap, Jan. 3, 1953, Gressitt; two males, Mt. Temwetemwensekir, 180 m., Ponape, light trap, Jan. 16, 1953, Gressitt; male, Sokehs I., Ponape, light trap, Jan. 29, 1953, Gressitt; male, Mt. Tafeayat, Kusaie, Aug. 20, 1946, Townes.

Other specimens. Palau: Two females, Koror I., Sept. 1952, Krauss; male, Koror I., Sept. 16, 1952, Beardsley; two females, Koror I., July 24-26, 1956, McDaniel; six females, male, Koror I., Apr. 17-29 and May 30, 1957, Sabrosky; female, Koror I., Nov. 24, 1947, Dybas; three females, five males, Peleliu, Aug. 30, 1945, Dybas; female, Ngaremlengui, Babelthuap I., at light, June 1, 1957, Sabrosky. Yap: Female, three males, Yap I., Aug.-Oct., 1952, Krauss; eight females, Kanif, Yap I., July 30, 1950, Goss; female, Kolonia, Yap I., Aug. 23, 1950, Goss; two females, two males, Gagil Distr., July-Aug. 1950, Goss; male, S. Yap I., July 14, 1950, Goss; male, Yap I., June 30, 1950, Goss. Truk: Male, Mt. Unibot, Ton I., Jan. 3, 1953, Gressitt; two males, Mt. Chukumong, Wena I., light trap, Dec. 27, 1952, Gressitt; two females, Wena I., June 2, 1946, Townes. Ponape: Male, Agric. Expt. Sta., Colonia, light trap, Jan. 6, 1953, Gressitt; female, two males, Mt. Temwetemwensekir, 180 m., light trap, Jan. 18-19, 1953, Gressitt; two females, Nanpohnmal, Jan. 8, 1953, Gressitt. Kusaie: Male, Mutunlik, light trap, Jan. 24, 1953, Gressitt; male, Mwot, light trap, Apr. 10, 1953, Clarke.

DISTRIBUTION: Caroline Is. (Palau, Yap, Truk, Ponape, Kusaie).

The present species is similar to *M. subnudus* Edwards (Europe) and *M. discretus* Johannsen (Java) in general appearance, but may be easily separated by the highly specific structure of the male hypopygium and the smaller AR.

Genus **Cricotopus** van der Wulp

Cricotopus van der Wulp, 1874, Tijdschr. Ent. **17**: 132.—Edwards, 1929, Ent. Soc. London, Trans. **77**: 317.—Goetghebuer, 1932, Faune France **23**: *27*; 1934, Rev. Zool. Bot. Afr. **25**: 200.—Tokunaga, 1936, Tenthredo **1**: 10.—Freeman, 1953, Roy. Ent. Soc. London, Proc. B, **22**: 130; 1956, British Mus. (N.H.) Ent. Bull. **4**: 303.

Trichocladius Kieffer, 1923, Soc. Ent. France, Ann. **92**: 182 (in part).

Eyes densely pubescent. Thorax with humeral pits small, dorsocentral setae minute and decumbent, punctures from which setae arise scarcely visible under binocular microscope; abdomen often with yellow markings. Male hypopygium and female cerci often white; male without anal point of hypopygium. Legs with tibiae, especially fore pair, usually with broad white ring; wing membrane devoid of macrotrichia and microtrichia, anal lobe of wing rather well developed, squama fringed, R_{4+5} reaching at least three-fourths of wing length.

Species of *Cricotopus* are generally aquatic, though some are terrestrial.

Key to Micronesian Species of Cricotopus

1. Abdominal tergite 4 entirely yellow.......... 2
   Abdominal tergite 4 with brown posterior band similarly to other tergites.......... **12. gressitti**

2(1). Thorax with scutum almost entirely brown and without distinctly separated vittae.......... **13. sabroskyi**
   Thorax with three scutal vittae distinctly separated and brown on yellow ground color.......... 3

3(2). Abdominal tergites 6 and 7 almost entirely yellow and with very narrow posterior brown bands.......... **14. quadrizonatus**
   Abdominal tergites 6 and 7 almost entirely brown.......... **15. species No. 1**

12. **Cricotopus gressitti** Tokunaga, n. sp. (fig. 4, *f*).

Small yellow and brown species with fore tibiae largely white, abdomen yellow on first basal segment and other segments yellow on basal half and brown on apical half, but last two caudal segments more extensively brown, scutum yellow and four scutal vittae distinctly separated; LR 0.58-0.6.

Male: Body 1.88 (1.7-2.04) mm. long; wings 1.09 (1.08-1.09) mm. by 0.35 (0.34-0.36) mm. Head brown, with mouthparts yellowish pale brown, eyes separated by slightly less than length of eye (14.3: 16.8); palp five-segmented (8: 8: 19: 23: 43); antenna with scape brown, flagellum missing. Thorax with scutum mainly yellow, four scutal vittae dark, postscutellum black to dark brown, scutellum pale brown or yellow and with 10 to 16 small setae, pleural side largely yellow, but sclerite under wing base brown, sternum brown. Legs with coxae brown to pale or yellowish brown, trochanters yellow, femora yellow basally, dark or brownish on apical half of fore and hind femora, and on apical fourth of mid femur, fore tibia almost entirely white and other tibiae yellow, but sometimes both or distal ends of all tibiae very faintly fuscus; tarsal segments brown, but gradually more fuscus on apical segments; LR 0.59 (0.58-0.6), RL-FT 38.8: 42.5. Wing rather broad, with anterior veins very pale fuscus, squama with five to seven marginal setae, anal lobe well developed, costa slightly beyond tip of R_{4+5} and 1.5 or 2 times length of r-m, R_{4+5} ending above or slightly beyond tip of M_{3+4}, fMCu slightly beyond r-m, RL-V 30.3: 16.7: 37.3: 35.3. Halter white. Abdomen almost entirely dark brown, but sometimes first basal segment and anterior parts of all tergites slightly paler; hypopygium (fig. 4, *f*) white, coxite elongate, longer than twice width (47.5: 22.5), tapered and without lobe, style rather slender, slightly undulate and clavate, half as long as coxite (23.8: 47.5) and with small apical spine.

Female: Body 1.89 (1.69-2.08) mm. long; wings 1.24 (1.18-1.3) mm. by 0.44 (0.4-0.48) mm. General coloration and structure very similar to male with usual sexual differences, but darker part more intensive, being more in contrast than in male. Eyes more widely separated above than in male; palp five-segmented (9: 8.5: 20: 24: 30); antenna brownish but paler on segments 2 to 4, six-segmented (13: 22: 15: 13: 11: 19), segments 3 to 4 fusiform, 5 oval and 6 oblong. Thorax with caudoscutal area and scutellum slightly fuscus yellow, scutellum with 14 to 16 setae. Legs with coxae brown, fore tibia entirely white and other tibiae entirely yellow, fore tarsus entirely dark brown; LR as in male, RL-FT 45: 49.5. RL-V 33.5: 44: 38. Abdomen with first basal segment yellowish pale brown, other segments with tergites yellow on basal half and brown on apical half, but ultimate two tergites almost entirely brown; cercus white.

Holotype, female (BISHOP 3370), Agric. Expt. Sta., Colonia, Ponape, light trap, Jan. 7, 1953, Gressitt. Allotype, male (BISHOP), Mt. Temwetem-

wensekir, 180 m., Ponape, light trap, Jan. 19, 1953, Gressitt. Paratypes (US), female, two males, same data as for holotype; male, same data as for allotype.

DISTRIBUTION: Caroline Is. (Ponape).

This is very similar in general appearance to *C. carnosus* Kieffer (Formosa), from which it may be easily distinguished by the absence of the pulvilli, the larger LR (about 0.5 in *carnosus*), the elongate style of the male hypopygium (oval in *carnosus*) and the single apical spine of the style instead of a group of very short spines as in *carnosus*. Palaearctic *C. ephippium* Zetterstedt and *C. oscillator* (Meigen) are also similar to the present species in general appearance, but the male hypopygia of these two species are provided with the lobes of the coxites differing from the present new species.

13. Cricotopus sabroskyi Tokunaga, n. sp. (fig. 4, *e*).

Small brown and yellow species, all tibiae white except distal brownish ends, scutum almost entirely brown, abdomen with segments 1 and 4 yellow and other segments mainly brown. AR 0.77-0.87, LR 0.58-0.62 in male and about 0.56 in female.

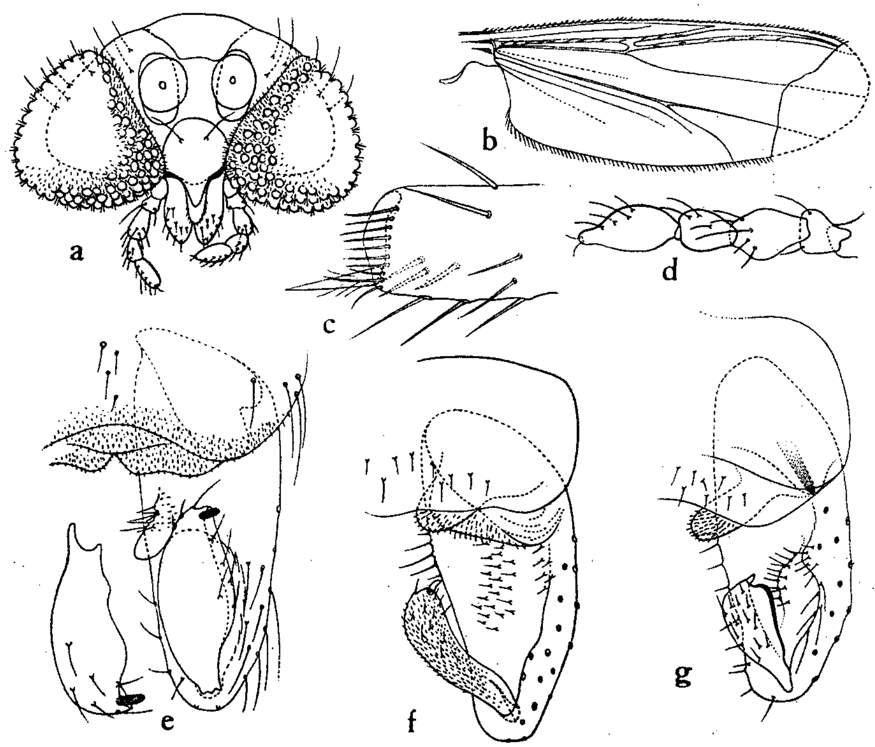


FIGURE 4.—**a-d**, *Nanocladius* sp. No. 1, female: *a*, head; *b*, wing; *c*, apical end of hind tibia; *d*, palp. **e-g**, *Cricotopus*, male hypopygia: *e*, *C. sabroskyi*; *f*, *C. gressitti*; *g*, *C. quadrizonatus*.

Male: Body 1.98 (1.76-2.3) mm. long, wings 1.15 (1.08-1.22) mm. by 0.34 (0.33-0.36) mm. Head entirely brown; palp five-segmented (9: 10: 17.5: 24: 35); antenna with scape black, other segments and plumose hairs brown, AR 0.81 (0.77-0.87). Thorax with scutum almost entirely brown, indistinctly paler on shoulder areas and along fovea, scutal vittae indistinct, postscutellum and sternum brown, scutellum yellowish brown and with 6 to 12 small setae, pleuron yellowish brown. Legs with coxae brown, trochanters and femoral bases yellowish pale brown, femora largely brown or slightly yellowish brown, tibiae almost entirely white, with apical ends brownish and sometimes basal end faintly brownish, tarsal segments mainly brown, but in mid and hind legs, basal three segments paler, LR 0.59 (0.58-0.62). Wing with anterior veins pale brown, costa slightly produced beyond end of R_{4+5} as long as r-m, R_{4+5} almost straight, ending midway between tips of M_{1+2} and M_{3+4}, fMCu under origin of r-m, RL-V 31.7: 20.3: 42.7: 35, squama bare or with one to two marginal setae. Halter yellowish white. Abdomen with segments 1 and 4 entirely yellow, other segments almost entirely brown, but tergites 2 to 3 faintly yellowish along anterior margins; hypopygium (fig. 4, *e*) white, coxite long, tapered, and with small oval lobe at middle, style rather large, slightly shorter than half of coxite (20.3: 45.3), not distinctly arcuate, but rather swollen at middle, with apical spine strong and dark.

Female: Body about 1.69 mm. long; wings about 1.22 mm. by 0.39 mm. Generally similar to male with usual sexual differences, but somewhat paler. Palp five-segmented (about 10: 11: 22: 31: 46); antenna brown and six-segmented (10: 18: 11.5: 11: 11: 28). Thorax generally yellowish brown, but without distinct scutal vittae as in male. LR about 0.56. RL-V about 32: 22: 49: 34. Abdomen with cerci white.

Holotype, male (US 66534), Ngaremlengui, Babelthuap I., Palau, light trap, June 1, 1957, Sabrosky. Allotype, female (US), data same as for holotype. Paratypes (BISHOP, US), 13 males, data same as for holotype.

Other specimens. Palau: Four males, Ngaremlengui, Babelthuap I., at light, June 1, 1957, Sabrosky; three females, Koror I., Sept. 16, 1952, Beardsley; female, Peleliu I., Aug. 30, 1948, Dybas.

DISTRIBUTION: Caroline Is. (Palau).

Though very closely allied to *C. bicinctus* Meigen (Palaearctic) in general appearance and structure of the male hypopygium, *C. sabroskyi* may be easily distinguished by the much smaller AR.

14. **Cricotopus quadrizonatus** Tokunaga, n. sp. (fig. 4, *g*).

Medium-sized, yellow and dark-brown species, scutum with three short, dark vittae, separated and distinct on yellow ground color, fore and mid tibiae with basal two-thirds white and distal one-third black, abdomen with many yellow and dark bands highly specific in their arrangement; AR about 1.06.

Male: Body about 2.99 mm. long; wings about 1.72 mm. by 0.48 mm. Head with vertex fuscus yellow, frons yellow, mouthparts dark, eyes separated above by length of eye; palp dark and five-segmented (8: 11: 22: 29: 44); antenna with scape yellowish brown, other segments and plumose hairs dark, AR about 1.06. Thorax mainly yellow, scutum with three vittae separated and dark, scutellum brown and with about 14 scattered setae, postscutellum black. Legs with coxae yellow on mesal and brown on lateral side, trochanters and larger parts of femora yellow, fore femur dark brown on apical two-fifths, middle only at tip and hind on apical fourth, fore and mid tibiae white on basal two-thirds and black on apical third, hind tibia mainly black and only yellow at extreme basis, tarsi entirely dark, RL-FT 60: 75; fore tarsus missing. Wing with membrane gray in dry state, anterior veins pale brown, squama with four to seven marginal setae, anal lobe well developed and round on margin, costa distinctly produced beyond tip of R_{4+5} for distance twice r-m, R_{4+5} ending beyond tip of M_{3+4},

RL-V 48: 25: 60: 56. Halter with stem dark brown and knob white. Abdomen with small setae arranged along mid-dorsal line, mainly yellow and with four distinct black bands and two very slender dark bands; first basal and ultimate segment and hypopygium white, segment 2 dark on apical two-fifths, 3 dark on apical three-fifths, 4 entirely yellow, 5 entirely dark, 6 and 7 almost entirely yellow and only dark on caudal margins, 8 entirely dark; hypopygium (fig. 4, *g*) with coxite elongate, about three times as long as style, lobe of coxite low and not prominent, but setigerous and situated beyond middle, style short, suboval, with narrow base, distinct edge on flexor side and small apical spine.

Female: Unknown.

Holotype, male (BISHOP 3371), Futami-ko, Chichi Jima, Bonin Is., May 10, 1956, Clagg.

DISTRIBUTION: Bonin Is. (Chichi Jima).

This species is very closely allied to *C. meilloni* Freeman (Africa), from which it may be separated by the round (not right-angled) anal lobe, the non-prominent lobe of the coxite and the broad and short style of the hypopygium.

15. Cricotopus sp. No. 1.

Medium-sized yellow and dark brown species with three distinctly separated scutal vittae and two pale bands on dark abdomen at segments 1 and 4, fore tibia with broad white band on middle part.

Female: Body about 3.19 mm. long; wings about 1.82 mm. by 0.59 mm. Head entirely brown, with eyes rather widely separated above for distance of 1.5 times length of eye; antenna entirely brown, six-segmented (about 10: 21: 12: 11: 12: 33), segments 3 to 5 oval. Thorax with ground color yellow, three scutal vittae, postscutellum, pleural sclerite just beneath wing base, and sternum brown, caudoscutal area and scutellum pale brown. Legs with coxae brown, trochanters and basal half of femora yellow, distal half of femora brown, fore tibia largely white and both ends distinctly brown, other tibiae largely yellowish white, tarsi pale brown, but first basal segments yellowish. Wing with anterior veins fuscus, costa slightly produced a little longer than r-m (6: 4), fMCu under origin of r-m, RL-V 52: 33: 65: 55. Halter white. Abdomen generally dark or brown, but first basal segment very pale and almost white, segment 4 entirely white, segments 2 and 3 entirely black, 5 to 8 dark brown to brown, but with narrow yellowish bands along anterior margin, last segment dark brown, cerci white.

Male: Unknown.

DISTRIBUTION: Marshall Is.

MARSHALL IS. KWAJALEIN: Female, Kwajalein I., light trap, Nov. 1956, Clagg.

This is very similar to the European *C. dizonias* Meigen.

Genus **Orthocladius** van der Wulp

Orthocladius van der Wulp, 1874, Tijdschr. Ent. **17**: 132.—Kieffer, 1906, Genera Insectorum **42**: 25 (in part).—Freeman, 1956, British Mus. (N.H.) Ent. Bull. **4**: 330.

Spaniotoma subgen. *Orthocladius* (groups C-F), Edwards, 1929, Ent. Soc. London, Trans. **77**: 344.

Orthocladius sen. str. and subgen. *Pseudorthocladius* Goetghebuer, 1932,

Faune France **23**: 84, 93; IN Lindner, 1942, Flieg. Palaearkt. Reg. **13**, g: 31, 73.

Hydrobaenus (Fries), Edwards, 1940, Roy. Ent. Soc. London, Proc. B, **9**: 154 (in part).

Pseudorthocladius (Goetghebuer), Freeman, 1953, Roy. Ent. Soc. London, Proc. B, **22**: 134.

Eyes bare; wing membrane faintly brownish or purplish by transmitted light, without distinguishable microtrichia; smooth bare area at base of scutellum usually sharply marked off from dull posterior area; empodium variably developed, pulvilli absent; squama fringed, R_{2+3} ending distinctly on costa, clearly separated from R_{4+5}.

16. **Orthocladius** sp. No. 1.

Medium-sized black species. Male LR 0.68; wing of male with costa not produced beyond tip of R_{4+5}, R_{2+3} closer to R_1 than R_{4+5}, fMCu just beyond r-m and inner angle very narrow, squama completely fringed, anal lobe well formed; antennae, abdomen and halters missing.

Male: Wing about 2.43 mm. by 0.68 mm. Body generally black. Head entirely brown, with eyes separated above by almost length of eye; palp brown, five-segmented (10: 17: 27: 22: 46); antenna with scape dark brown, flagellum missing. Thorax with tergites dark brown, pleuron yellowish pale brown, sternum brown. Legs very slender and long, coxae dark brown, other segments entirely brown, penultimate tarsal segment of fore leg very slender; LR 0.68, RL-FT 61: 75. Wing brownish but very pale, probably milky white in life, squama completely fringed with 20 to 21 setae, anal lobe well formed, costa not produced, ending beyond tip of M_{3+4}, R_{2+3} more approximating R_1 than R_{4+5}, R_{4+5} almost straight, r-m about twice base of R_{4+5}, M_{1+2} almost straight and ending just behind of wing tip, fMCu slightly beyond r-m and with inner angle very narrow, Cu_1 almost straight ending under tip of R_1, RL-V 69: 51: 97.5: 75. Abdomen broken off.

Female: Unknown.

DISTRIBUTION: Caroline Is.

PALAU. KOROR: Male, May 1957, Sabrosky.

This species seems to belong to Edward's group C.

Genus **Nanocladius** Kieffer

Nanocladius Kieffer, 1913, Voy. Alluaud et Jeannel, Afr. Orient. Ins. Dipt. **1**: 31.—Freeman, 1954, Roy. Ent. Soc. London, Proc. B, **23**: 175; 1956, British Mus. (N.H.) Ent. Bull. **4**: 338.

Eukiefferiella Thienemann, 1926, Archiv Hydrobiol. **17**: 325.—Goetghebuer, 1932, Faune France **23**: 98; 1944, IN Lindner, Flieg. Palaearkt. Reg. **13**, g: 114.

Microcricotopus Thienemann and Harnish, 1932, Zool. Anzieger **99**: 137.

Akiefferiella Thienemann, 1936, Stett. Ent. Zeitung **97**: 43.

Parakiefferiella Thienemann, 1936, Ibid. **97**: 43.

Eukiefferiella (*Camptokiefferiella*) Goetghebuer, 1944, IN Lindner, Flieg. Palaearkt. Reg. **13**, g: 122.

Spaniotoma subgen. *Eukiefferiella,* Edwards, 1929, Ent. Soc. London, Trans. **77**: 350.

Hydrobaenus subgen. *Eukiefferiella,* Coe, 1950, Handbook Ident. British Ins. **9**: 160.

Eyes bare or pubescent. Wings milky white, without distinguishable microtrichia or macrotrichia, squama bare or with incomplete fringe; R_{2+3} difficult to distinguish as it lies close to R_{4+5} and either fades out toward apex or indistinctly reaches costa at same point as R_{4+5}, fMCu well beyond r-m, R_{4+5} almost straight, tip slightly turned up toward costa, which ends well before wing tip; anal lobe more or less round, not produced. Empodia well developed, pulvilli usually absent, when present quite small, tarsal spurs absent. Small species, never entirely black.

17. **Nanocladius** sp. No. 1 (fig. 4, *a-d*).

Medium-sized, yellowish pale brown species with rather large head, pubescent eyes, and short but five-segmented palp.

Female: Body about 2.21 mm. long; wings probably 1.99 mm. by 0.68 mm. Head, thorax, and abdominal caudal end pale or yellowish brown, legs and abdomen pale yellow or white. Head (fig. 4, *a*) subtriangular, more brownish, flattened and closely attached under thoracic anterior projection; eyes entirely densely pubescent, with facets not very compact, very widely separated above by more than length of eye; vertex with 12 to 13 setae behind eyes; mouthparts yellowish brown and with only two setae; palp (fig. 4, *d*) small, five-segmented (7: 7: 13: 10: 18), last segment with papilliform tip; antenna with scape brown and rather small, flagellum missing. Thorax projected cephalad over head capsule, yellowish brown, large and occupying more than one-third of body length, scutum with mid-dorsal pale line on anterior one-third, about nine small erect setae on either fovea arising from pale spots, four to five similar supraalar setae, scutellum with six small setae arranged in transverse line, postscutellum hemispherical. Legs long, slender, with all coxae yellowish brown, other segments yellowish white, but articulations brown, setae very short and rather sparse; all femora slender, middle tibial spur very small, hind tibia (fig. 4, *c*) with strong spur and apical comb of eight to nine setae; fore tibia and all tarsi missing. Wing (fig. 4, *b*) well developed, entirely pale brown, squama without marginal setae, anal lobe large, small setae present only on radial veins except for marginal setae, RL-V 49: 34: 81: 66, r-m short and as long as basal width of cell R_1, R_{2+3} atrophied, R_1 ending far before tip of Cu_1, fMCu under middle of R_1, Cu_1 slightly sinuous. Halter normal, with stem white and knob pale brown. Abdomen mainly yellowish white, last tergite brown, round on caudal margin, subgenital sternite broad, subrectangular, pale brown, with shallow caudal incision, 10 to 12 small setae arising from pale spots along each lateral margin of caudal incision, caudal end behind subgenital sternite semicircular in ventral aspect.

Male: Unknown.

DISTRIBUTION: Caroline Is.

PALAU. Koror: Female, at light, May 1957, Sabrosky.

This is represented only by a single, rather badly damaged female; however, the venation and shape of the wings seem to suggest that it belongs to *Nanocladius*.

Genus **Smittia** Holmgren

Smittia Holmgren, 1869, K. Sven. Vet.-Akad., Handl. **8**: 47.—Goetghebuer, 1943, IN Lindner, Flieg. Palaearkt. Reg. **13**, g: 77.—Freeman, 1953, Roy. Ent. Soc. London, Proc. B, **22**: 206.—Freeman, 1956, British Mus. (N.H.) Ent. Bull. **4**: 346.

Spaniotoma subgen. *Smittia,* Edwards, 1929, Ent. Soc. London, Trans. **77**: 357.

Camptocladius van der Wulp, 1874, Tijdschr. Ent. **17**: 133.—Kieffer, 1918, Mus. Nat. Hungarici, Ann. **16**: 76.

Allocladius Kieffer, 1913, Voy. All. et Jean. Afr. Orient. Ins. Dipt. **1**: 28.

Phaenocladius Kieffer, 1921, Archiv Hydrobiol., Suppl. **2**: 845.

Pseudosmittia Goetghebuer, 1932, Faune France **32**: 126.—Freeman, 1953, Roy. Ent. Soc. London, Proc. B, **22**: 208.

Euphaenocladius Thienemann, 1934, Encycl. Ent. Dipt. **7**: 29.

Orthosmittia Goetghebuer, 1943, IN Lindner, Flieg. Palaearkt. Reg. **13**, g: 110.—Freeman, 1953, Roy. Ent. Soc. London, Proc. B, **22**: 208.

Hydrobaenus subgen. *Smittia,* Coe, 1950, Handbook Ident. British Ins. **9**: 163.

Eusmittia Freeman, 1962, Pacific Ins. **4** (1): 129.

Eyes usually bare, rarely with pubescence; wing without macrotrichia or distinguishable microtrichia on membrane, sometimes with milky appearance in dry state; R_{2+3} almost always ending separately in costa, fMCu well beyond r-m, Cu_1 sometimes strongly curved or undulate; squama always completely bare; legs usually without pulvilli.

Small species, generally aquatic, often terrestrial, some marine in habitat.

Key to Micronesian Species of Smittia

MALES

1.	Eyes pubescent	**18. brevicornis**
	Eyes bare	2
2(1).	Wing with extra fork of Cu_2	**19. setiforceps**
	Wing with Cu_2 simple	3
3(2).	Costa not distinctly produced beyond tip of R_{4+5}	4
	Costa distinctly produced beyond tip of R_{4+5}	9
4(3).	AR 0.99-1.01	**20. palauensis**
	AR far smaller than 1.0	5
5(4).	Coxite of hypopygium with double lobes	**21. dupla**
	Coxite of hypopygium with single lobe	6
6(5).	AR larger than 0.5	7
	AR smaller than 0.5	8
7(6).	Lobe of coxite triangular; style short, almost straight and without basal tuft of setae	**22. kraussi**
	Lobe of coxite slender; style long, curved, and with basal tuft of setae	**23. triangula**
8(6).	LR 0.62; lobe of coxite slender	**24. yapensis**
	LR 0.53-0.58; lobe of coxite subtriangular	**25. micronesiana**
9(3).	Scutum yellow to white	**26. zonata**
	Scutum brown to black	10
10(9).	AR about 0.98 (0.8-1.07), apex of antenna distinctly clavate; anal point of hypopygium elongate and needlelike	**27. insulsa**
	AR about 0.64 (0.57-0.75), apex of antenna only slightly thickened; anal point of hypopygium small and subtriangular	**28. tuberculifera**

FEMALES

1. Eyes pubescent .... **18. brevicornis**
Eyes bare 2

2(1). Abdominal segment 9 with one pair of lateral hornlike caudal tubercles........ 3
Abdominal segment 9 without such caudal tubercles........ 4

3(2). Thorax entirely yellow; wing with costa strongly produced beyond tip of R_{4+5}........ **26. zonata**
Thorax not totally yellow, scutum with distinct brown vittae; wing with costa only slightly produced beyond tip of R_{4+5}........ **29. guamensis**

4(2). Abdomen distinctly bicolored, with basal one or more tergites yellow or white, posterior tergites dark or somewhat fuscus or tergites 6 and 7 yellow or very pale........ 5
Abdomen unicolored, with tergites almost uniformly pale, yellowish, brownish, fuscus, or black and sometimes gradually more brownish or fuscus caudad (usually with small pale spots at bases of setae)........ 9

5(4). Abdomen with tergites 6 and 7 entirely yellow or pale brownish yellow........ 6
Abdomen without precaudal yellow or pale tergites........ 8

6(5). Abdominal tergite 2 entirely yellow or pale yellow........ **30. bicinctura**
Abdominal tergite 2 entirely dark brown or black........ 7

7(6). Scutum with vittae distinct and brown on yellow ground color; wing with costa reaching halfway to wing tip from tip of R_{4+5}........ **22. kraussi**
Scutum uniformly yellow and without distinct vittae; wing with costa strongly produced beyond tip of R_{4+5} almost reaching wing tip........ **37. postcinctura**

8(5). Wing with costa strongly produced beyond tip of R_{4+5}; abdomen with first basal segment yellow........ **19. setiforceps**
Wing with costa fused with apical half of R_{4+5} and not produced beyond R_{4+5}; abdomen with basal three segments yellow........ **32. fusivenosa**

9(4). Wing with costa not distinctly produced beyond tip of R_{4+5}, these two veins gradually fusing with each other and ending far before wing tip........ 10
Wing with costa strongly produced beyond tip of R_{4+5}, ending at or just before wing tip........ 12

10(9). Scutum, including caudoscutal area, almost entirely fuscus or dark........ **20. palauensis**
Scutum with at least caudoscutal area paler or yellowish........ 11

11(10). Scutum with three distinct brown vittae........ **23. triangula**
Scutum entirely yellow........ **33. species No. 1**

12(9). Scutum without brown separated vittae........ 13
Scutum with three separated brownish or dark vittae........ 14

13(12). Antenna with elongate slender sensillae and neck parts on intermediate flagellar segments .... **21. dupla**
Antenna with short stout sensillae and neck parts on intermediate flagellar segments........ **28. tuberculifera**

14(12). Antenna with paired sensillae of segments two to five short, stout, not extending beyond segments........ **25. micronesiana**
Antenna with paired sensillae of segments two to five long, slender, extending beyond segments........ 15

15(14). Intermediate flagellar segments of antenna with distinct neck parts........ **24. yapensis**
Intermediate flagellar segments of antenna without distinct neck parts........ 16

16(15). LR 0.53-0.59; last antennal segment subequal to preceding two segments together........ **27. insulsa**
LR 0.48; last antennal segment longer than preceding two segments together........ **34. species No. 2**

18. Smittia brevicornis Tokunaga, n. sp. (figs. 5, *a*; 6, *a*).

Very small, dark brown or brown species; eyes pubescent with short hairs, AR about only 0.16, male with scutum almost uniformly dark brown, female with four brown scutal vittae on pale ground color; LR 0.44-0.46; wing with anal lobe obtuse, costa not produced beyond end of R_{4+5} and ending above or just before tip of M_{3+4}, Cu_1 strongly sinuous.

Male: Body about 1.72 mm. long; wing about 1.0 mm. by 0.31 mm. Generally brown, but abdomen and legs paler. Head dark brown, with eyes entirely pubescent and more widely separated above than length of eye; palp very pale brown and five-segmented (6: 8: 17: 24: 35); antenna (fig. 5, *a*) entirely brown, 13-segmented, with unusually sparse plumose hairs, last segment short, without plumose hairs and incompletely segmented from penultimate, intermediate flagellar segments generally fusiform; AR 0.16, RL-A (except scape) about 10: 7.5: 7.5: 8.5: 9.5: 10: 10: 10: 11.5: 10: 8: 20. Thorax extensively dark brown, scutum with mid-dorsal stripe and shoulder parts pale brown, small spots above wing bases yellow, scutellum yellowish brown and with four bristles. Legs entirely pale brown, bases of femora paler, LR 0.44, RL-FT 27.5: 35. Wing slender, with anal lobe obtuse, R and M brown, other veins very pale, costa ending above or just before tip of M_{3+4} and not produced, apical costal margin beyond costal end somewhat thickened, RL-V 27: 13.5: 30: 37, R_{4+5} almost straight, R_{2+3} extending closer to R_{4+5} than to R_1, fMCu under apical third of R_1, Cu_1 strongly undulate, Cu_2 simple, 1A atrophied under r-m. Halter white. Abdomen uniformly fuscus pale brown; hypopygium (fig. 6, *a*) yellowish pale brown, no anal point, coxite with lobe small, subtriangular, blunt, pubescent and situated slightly beyond middle of dorsal side, style slightly shorter than one-half of coxite, inflated on middle part and narrowed at both ends.

Female: Body 1.64 (1.48-1.87) mm. long; wings 0.96 (0.84-1.01) mm. by 0.36 (0.31-0.38) mm. General appearance much paler yellow than male. Head brown, with mouthparts very pale brown, eyes separated by length of an eye; palp very pale brown, five-segmented (6.5: 6.5: 15.5: 23.8: 33); antenna entirely brown, six-segmented (9.7: 16.7: 10.3: 9.5: 10.3: 17.7), intermediate flagellar segment short oval and with sensillae short. Thorax pale brownish yellow, scutum with four brown vittae, humeral areas white, caudoscutal area slightly fuscus, scutellum with five to seven setae along caudal margin, postscutellum brown. Legs yellowish pale brown, LR 0.45 (0.44-0.46), RL-FT 24.5: 30.9. Wing with anal lobe obtuse, veins pale brown, RL-V 19.5: 13.7: 35.5: 31.3. Abdomen very pale uniformly or slightly more brownish on caudal segments.

Holotype, male (US 66535), Angaur I., Palau, Feb. 4, 1948, Dybas. Allotype, female (US), Angaur I., Palau, Feb. 3, 1948, Dybas. Paratypes (CM, BISHOP), four females, male, same data as for holotype; three females, same data as for allotype; female, Ngerkabesang I., Palau, seashore, Nov. 16, 1947, Dybas.

Other specimens. Palau: Four females, SW. Koror I., light trap, Dec. 12-18, 1952, Gressitt. Yap: 15 females, nine males, Gagil, at light, June 19, 1957, Sabrosky; four females, Dugor, Weloy, Yap I., light trap, Jan. 6, 1957, Sabrosky; female, Dugor, Weloy, Yap I., June 14, 1957, Sabrosky.

DISTRIBUTION: Caroline Is. (Palau, Yap).

This is the only Micronesian species of *Smittia* known to me which has pubescent eyes. *S. capicola* Freeman (South Africa) has a similar small AR (0.2), but the male hypopygium is quite different and the eyes are bare. *S. bavarica* Kieffer (Europe) is similar in general appearance but it has far larger

AR (about 1.0). The wing of *S. guineensis* Freeman (Africa) shows the costal thickening beyond the costal vein as in the present species, but the AR is larger (0.7) and the eyes are bare.

19. **Smittia setiforceps** Tokunaga, n. sp. (figs. 5, *g*; 6, *b*).

Very small brown and yellow species, scutum with three more or less brownish vittae on paler ground color. AR about 0.87, female antenna with neck parts of intermediate flagellar segments slender and long, LR about 0.47 in male and 0.42 in female, male wing with costa not produced and ending before tip of M_{3+4}, Cu_1 forked, female wing with costa produced beyond tip of R_{4+5} longer than R_1.

Male: Body about 1.74 mm. long. Wing 1.07 mm. by 0.29 mm. Head with vertex brown, other parts yellow, eyes separated above by slightly more than length of eye; palp five-segmented (5: 8: 19: 21: 30); antenna with scape dark brown, flagellum and plumose hairs brown, 14-segmented, last segment slightly thickened apically, subequal to preceding 11 segments together, with apical pubescence on distal one-fifth, AR 0.87.

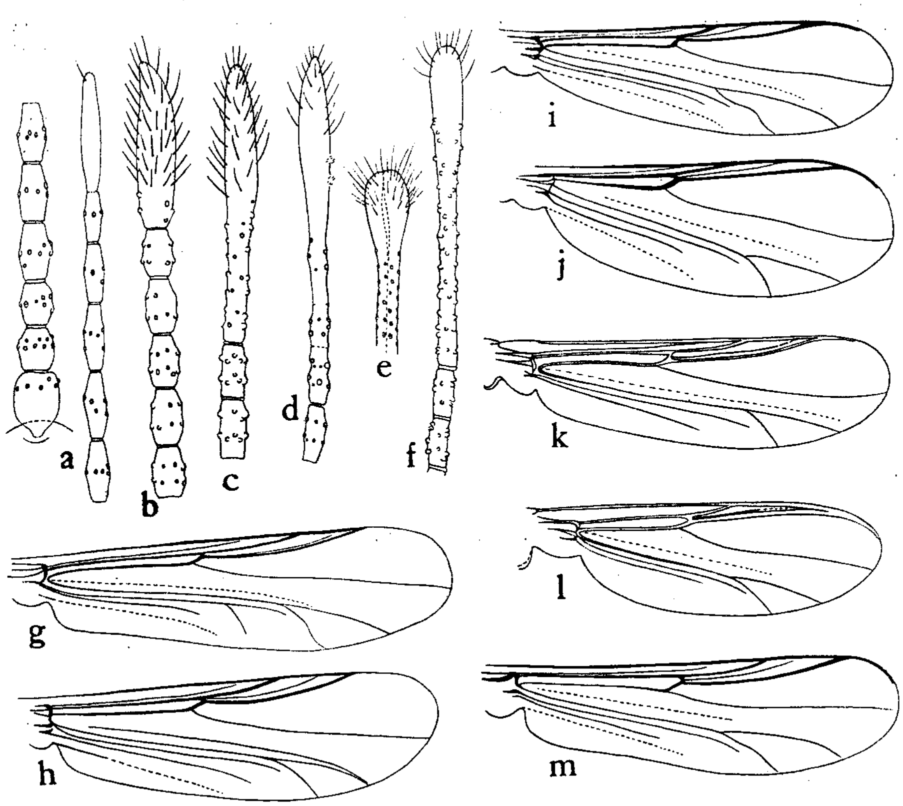


FIGURE 5.—*Smittia* spp. **a-f,** male antennae: *a, S. brevicornis; b, S. dupla; c, S. micronesiana; d, S. zonata; e, S. insulsa; f, S. tuberculifera.* **g-m,** wings: *g, S. setiforceps,* male; *h, S. micronesiana,* male; *i, S. zonata,* male; *j, S. zonata,* female; *k, S. insulsa,* male; *l, S. insulsa,* female; *m, S. tuberculifera,* male.

Thorax yellow and brown, four scutal vittae, postscutellum, pleuron and sternum brown, scutellum with six setae. Legs pale brownish, LR 0.47, RL-FT 30: 36. Wing (fig. 5, *g*) veins very pale brown, anal lobe small and obtuse, costa not produced and ending just before tip of M_{3+4}, R_{2+3} approximating R_{4+5}, RL-V 30:17: 29: 45, fMCu slightly before tip of R_1, Cu_1 undulate, Cu_2 forked slightly beyond r-m, 1A atrophied under r-m. Halter white. Abdomen brown, basal tergite widely yellow; hypopygium (fig. 6, *b*) yellowish brown, anal point absent, coxite rather slender, projected caudad slightly beyond base of style, with eight strong apical bristles arranged in line on dorsal side, mesal side flattened, setigerous, bluntly produced apically and with small setigerous tubercle on preapical part of ventral side, style slender, arcuate, and about half as long as coxite.

Female: Body about 1.09 mm. long; wings about 0.81 mm. by 0.25 mm. General appearance paler than male. Five segments of palp about 4: 4.5: 9: 10: 16, last segment very slender; antenna brown, six-segmented (10: 18: 17.5: 18: 16: 28), intermediate flagellar segments flasklike, with neck parts slender and sensilla almost as long as segments. Thorax with scutal vittae pale brown and not distinctly defined, scutellum with five setae. Legs mainly pale fuscus or yellowish pale brown, LR about 0.42, RL-FT 16.5: 20.5, RL-T of hind leg 41: 16: 21: 9.5: 11.5, tarsal segment 3 longer than 2. Wing with veins very pale, anal lobe narrow, costa strongly produced as long as R_1 or more and ending slightly before wing tip, fMCu slightly beyond tip of R_1, R_{4+5} as long as R (21: 20.5) and three times R_1 (21: 7). Abdomen fuscus pale brown, basal segment yellow, pleural membranes uniformly and finely dotted, cercus yellow.

Holotype, male (US 66536), Ngiwal, Babelthuap I., Palau Is., at light, May 19, 1957, Sabrosky. Allotype, female (US), Koror I., Palau Is., at light, May 29, 1957, Sabrosky.

DISTRIBUTION: Caroline Is. (Palau).

This is the only Micronesian species in which Cu_2 has an extra fork. The marine *Orthocladius* (*Dactylocladius*) *fucicola* Edwards (Europe) resembles the present species but the AR is a little longer than 1.0, the scutum is almost entirely dark, the anal point of the male hypopygium is slender, and the style has a blunt end, all unlike the new species. The marine *littoralis* Tokunaga (Japan) is more similar to *setiforceps,* but differs in the smaller AR (0.6), larger LR (0.7) and hornlike tubercles on the caudal segment of the female abdomen.

20. **Smittia palauensis** Tokunaga, n. sp. (fig. 6, *c*).

Minute, dark-brown species, both sexes with scutum almost uniformly dark brown. AR 0.99-1.01, female antenna with intermediate flagellar segments flasklike and with slender neck parts, LR 0.54 in male and 0.47-0.49 in female, wing with costa not produced beyond tip of R_{4+5}, ending far before tip of M_{3+4}, fMCu more or less beyond tip of R_1.

Male: Body 1.5 (1.4-1.57) mm. long; wings 0.92 (0.88-1.0) mm. by 0.28 (0.26-0.3) mm. Generally dark brown or brown, but styles and coxites of hypopygium very pale and almost white. Head black, mouthparts paler, eyes far more widely separated above than length of eye; five-segmented palp (about 5.5: 7: 13: 17: 24.5); antenna entirely brown, AR 1.0 (0.99-1.01), last segment entirely slender and pubescent only at tip. Thorax entirely dark brown, scutum only yellowish above wing bases, scutellum with four to six setae. Legs with coxae dark brown, other segments all very pale brown, LR 0.54, RL-FT 20.5: 23.8. Wing veins very pale, anal lobe obtuse, costa not produced and ending far before tip of M_{3+4}, R_{2+3} approximate to R_{4+5}, RL-V 24.4: 12.3: 24.4: 39.5, fMCu usually somewhat beyond tip of R_1, Cu_1 not strongly curved, Cu_2 and 1A

atrophied far before fMCu. Halter white. Abdomen brown, more darkened posteriorly, but styles and coxites almost white, hypopygium (fig. 6, *c*) with anal point not produced caudad beyond tergite, triangular and dark, coxite with seven apical slender setae arranged in line on dorsal side, mesal side setigerous with many small erect setae, lobe elongate-triangular, sharply pointed, setigerous on one side, style small, about one-third as long as coxite, almost straight, tapered and subtriangular.

Female: Body 0.85 (0.82-0.87) mm. long; wings 0.63 (0.6-0.65) mm. by 0.22 (0.21-0.23) mm. Coloration and structure generally similar to male with usual sexual differences. Eyes separated above by 1.5 times length of eye; palp five-segmented (3.8: 4: 7.4: 7.6:

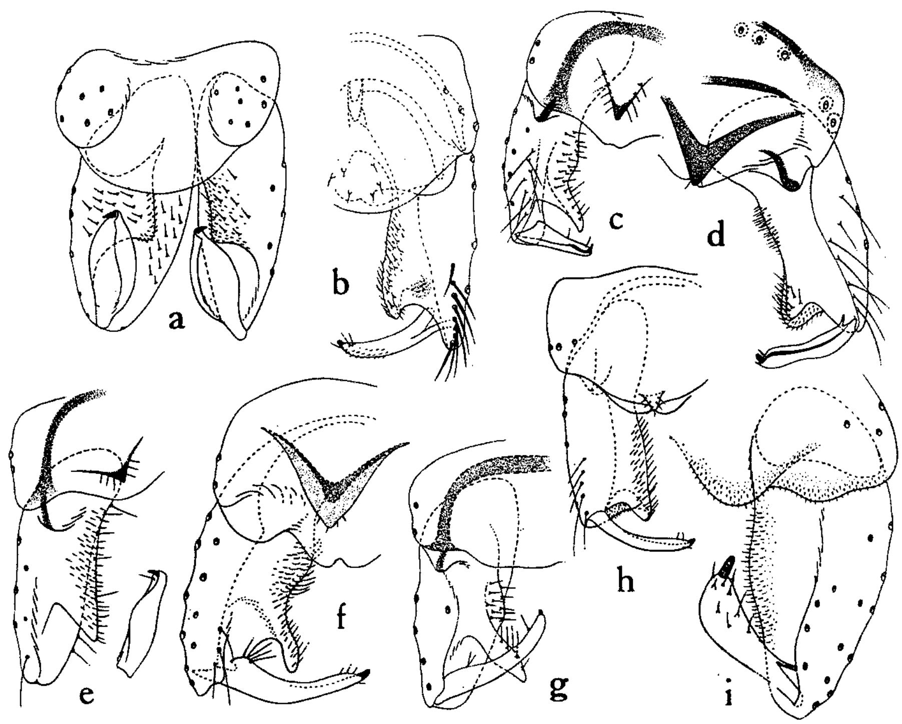


FIGURE 6.—*Smittia* spp., male hypopygia: **a**, *S. brevicornis;* **b**, *S. setiforceps;* **c**, *S. palauensis;* **d**, *S. dupla;* **e**, *S. kraussi;* **f**, *S. triangula;* **g**, *S. yapensis;* **h**, *S. micronesiana;* **i**, *S. zonata.*

12.6); antenna dark brown, six-segmented (6.8: 12.5: 10: 11.4: 10: 16.4), intermediate flagellar segments flasklike, with neck parts slender, sensillae also slender. Thorax with scutal humeral areas and lateral margins fuscus yellow, dorsocentral setae arising from pale spots. Legs fuscus pale brown, but coxae darker, trochanters and femoral bases paler, LR 0.48 (0.47-0.49), RL-FT 14.3: 17.8. Wing with anal lobe almost absent, costa not produced, but fused with apical fourth of R_{4+5}, veins pale fuscus, but R_{4+5} and costa between tips of R_1 and R_{4+5} darkened, RL-V 14.3: 5: 20: 26.7, R_{2+3} obscure, M_{3+4}, Cu_1, Cu_2 and 1A very faint. Abdomen entirely dark, cerci and spermathecae dark brown.

Holotype, male (US 66537), Angaur I., Palau, Feb. 5, 1948, Dybas. Allotype, female (US), Ngaremlengui, Babelthuap I., Palau, light trap, June 3, 1957, Sabrosky. Paratypes, Palau: two males, Ngiwal, Babelthuap I., light trap, May 19-20, 1957, Sabrosky; male, Koror I., Sept. 1952, Krauss; male, Koror I., May 30, 1957, Sabrosky; male, Ngaremlengui, Babelthuap I., light trap, June 1, 1957, Sabrosky; two females with allotype; female, Koror I., Apr. 29, 1957, Sabrosky; three males, Ngaremlengui, Babelthuap I., June 1, 1957, Sabrosky.

Other specimens. Palau: Four females, three males, Ngiwal, Babelthuap I., light trap, May 20, 1957, Sabrosky; four males, Melekeiok, Babelthuap I., May 22, 1957, Sabrosky; two males, Ngaremlengui, Babelthuap I., June 1, 1957, Sabrosky; male, SW. Koror I., Dec. 5, 1952, Gressitt; male, Koror I., Nov. 1952, Krauss; male, Koror I., Apr. 29, 1957, Sabrosky.

DISTRIBUTION: Caroline Is. (Palau).

This is similar to the marine *S. bifurcata* Tokunaga and *littoralis* Tokunaga (Japan), especially in the structures of the male hypopygia, but is rather easily separated by the absence of the extra bifurcation in the anal wing cell and the rather short styles of the male hypopygia.

21. **Smittia dupla** Tokunaga, n. sp. (figs. 5, *b*; 6, *d*).

Minute species; male dark brown and female with thorax yellowish and other parts dark, male wing with costa not produced but female with costa produced beyond tip of R_{4+5} as long as R_1. AR about 0.31, female antenna with intermediate flagellar segments flask-shaped and with neck parts slender, LR 0.49 in male and 0.43 in female.

Male: Body 1.5 mm. long; wings 0.87 mm. by 0.26 mm. Head dark brown, eyes separated above by 1.4 times length of eye; palp pale brownish and five-segmented (6: 7: 14: 17: 25); antenna (fig. 5, *b*) 14-segmented, last segment subequal to preceding three segments together, with verticils on basal fourth and pubescent on apical three-fourths; AR 0.31, RL-A8 10.5: 10.5: 10.8: 11.3: 11.3: 11.5: 10.8: 28.5. Thorax entirely dark brown or scutum somewhat paler along foveae, on humeral and caudoscutal areas; scutellum with six bristles. Legs almost entirely dark brown, but trochanters and femoral bases paler or yellowish, fore femur somewhat thickened at middle, other femora broadened basally; LR 0.49, RL-FT 25.5: 29.5. Wing with anterior veins pale brown or pale fuscus, costa not produced beyond tip of R_{4+5} and ending before tip of M_{3+4}, RL-V 21.5: 12: 24: 35, R_{2+3} approximating R_{4+5}, fMCu under tip of R_1, Cu_1 slightly curved, Cu_2 atrophied under fMCu, 1A ending far before fMCu, anal lobe very obtuse. Halter yellowish white. Abdomen dark brown, with pale spots at bases of setae; hypopygium (fig. 6, *d*) dark, with anal point large, triangular and not produced beyond tergal-caudal margin, coxite about 2.2 times as long as style, apical lobes of mesal side small and double, ventral lobe semicircular and finely pubescent, dorsal lobe smaller, subtriangular and setiferous, style rather slender, almost straight, slightly narrowed at middle.

Female: Body 1.17 mm. long; wing 0.83 mm. by 0.3 mm. General appearance unlike male, thoracic scutum mainly yellow and yellowish white and with faint small fuscus clouds along anterior margin and across middle, scutellum yellow. Head dark, but frons and mouthparts pale brownish yellow, eyes separated above by length of eye; palp five-segmented (5: 5: 10: 11: 19), last segment slender; antenna dark, six-segmented (10: 21: 17: 17: 15: 29), intermediate flagellar segments flasklike and with long neck parts. Thorax with scutum and scutellum yellowish, other parts dark brown or brown, scutellum with four setae. Legs mainly pale fuscus yellow, fore leg more fuscus,

LR 0.43, RL-FT 18: 22. Wing with anal lobe almost absent, costa produced beyond tip of R_{4+5} as long as R_1 and ending slightly before wing tip, fMCu just before tip of R_1, RL-V 21: 9: 22: 27. Halter white. Abdomen black, sternites and pleural sides paler than tergites, pleural membranes uniformly and finely dotted, cerci fuscus pale brown, spermathecae dark.

Holotype, male (US 66538), Ailinglapalap Islet, Ailinglapalap Atoll, Marshall Is., Oct. 26, 1953, Beardsley. Allotype, female (US), Koror I., Palau Is., at light, May 29, 1957, Sabrosky. Paratype, male, Ine I., Arno Atoll, Marshall Is., June 21, 1950, La Rivers.

Other specimens. Marshall Is.: Two males, Ulika I., Majuro Atoll, June 27, 1950, La Rivers.

DISTRIBUTION. Caroline Is. (Palau), Marshall Is. (Ailinglapalap, Arno, Majuro).

This species is very closely allied to *S. setiforceps*, from which it may be separated by structures of style and lobe of the male coxite as figured, and by the coloration of the female abdomen as shown in the key.

22. **Smittia kraussi** Tokunaga, n. sp. (fig. 6, *e*).

Minute species with pale and dark forms. Pale form with three dark scutal vittae distinctly separated, abdomen yellowish with several fuscus bands; dark form with scutum and abdominal tergites almost entirely black. AR 0.5-0.68, last segment of male antenna pubescent only at tip; LR 0.65-0.7 in male and 0.55-0.63 in female; male wing with costa only slightly produced beyond tip of R_{4+5}, female with costa gradually fused with R_{4+5} and apical fused vein longer than R_1, in both sexes costa ending far before wing tip, anal lobe almost absent.

Male: Body 1.32 (1.22-1.42) mm. long; wings 0.82 (0.7-0.88) mm. by 0.25 (0.23-0.25) mm. Head dark, with mouthparts paler or yellowish, eyes more widely separated above than length of eye; palp five-segmented (4.5: 6.5: 10.8: 14.3: 22.3); antenna entirely dark, 14-segmented, but sometimes last two segments incompletely divided, last segment slightly clavate and pubescent only at tip, AR 0.6 (0.5-0.68). Thorax broadly dark brown, with caudoscutal area, humeral areas, lateral sides above wing bases, and scutellum brown or paler, in pale form three black scutal vittae distinctly separated and in dark form vittae confluent, scutellum with two to four setae. Legs with coxae dark, trochanters and femoral bases very pale or white, other segments uniformly pale brown (in pale form) or dark brown (in dark form), LR 0.68 (0.65-0.7) and RL-FT 19.6: 20.6. Wing with veins very pale, costa only slightly produced beyond tip of R_{4+5} and ending slightly before level of tip of M_{3+4}, fMCu beyond tip of R_1, RL-V 21.4: 11: 22.8: 34.8, Cu_1 only slightly arcuate, Cu_2 not reaching fMCu. Halter white or very slightly fuscus. Abdomen uniformly dark in dark form, but in pale form pale yellow, with slightly fuscus bands on caudal margin of tergites 1 to 4 and 8, uniformly fuscus on tergites 5 to 6, paler on tergites 7 and 9; hypopygium (fig. 6, *e*) with coxites and styles paler than tergites, anal point triangular, not produced beyond tergite, coxite rather slender, with mesal side entirely pubescent and setigerous, lobe triangular and located on preapical part of mesal side, style almost straight, slightly tapered beyond middle and about one-third as long as coxite (11: 29).

Female: Body 1.08 (1.0-1.17) mm. long; wings 0.65-0.74 mm. by 0.22-0.24 mm. Coloration of dark form as in male, but in pale form thorax with three very obvious brown scutal vittae, caudoscutal area slightly fuscus, pleural and sternal sclerites brown, postscutellum dark brown, other parts of thorax yellow, abdomen also yellow and tergites 2 to 5 and 8 to 9 with broad median dark bands. Eyes separated above by 1.5 times length of eye; palp five-segmented (4.3: 5.7: 9.7: 10.7: 15.7); antenna en-

tirely dark or brown, six-segmented (8: 15: 11: 11: 11: 19). LR 0.59 (0.55-0.63), RL-FT 15.5: 17.3. Wing with costa ending above tip of M_{3+4}, R_{4+5} almost straight and gradually fused with costa apically as long as one-third of R_{4+5}, RL-V 17: 5: 15.7+7.7: 25.2, fMCu slightly beyond tip of R_1.

Holotype, male (US 66539), Koror I., Palau, Sept. 1952, Krauss. Allotype, female (US), data same as for holotype. Paratypes, male, Melekeiok, Babelthuap I., Palau, light trap, May 24, 1957, Sabrosky; male, Ngiwal, Babelthuap I., light trap, May 31, 1957, Sabrosky; male, data same as for holotype; female, SW. Koror I., Palau, light trap, Dec. 5, 1952, Gressitt; four males, Werua I., Kapingamarangi Atoll, E. Caroline Is., July 9, 1954, Niering; female, Gachapar, Gagil, Yap Is., light trap, June 19, 1957, Sabrosky.

Other specimens. Palau: Two males, same data as for holotype. Caroline Atolls: 26 males, Werua I., Kapingamarangi Atoll, July 9, 1954, Niering; male, Taringa I., Kapingamarangi Atoll, at light, Niering.

DISTRIBUTION: Caroline Is. (Palau, Yap, Kapingamarangi).

This is similar to *S. guineensis* Kieffer (Africa), but in that species the AR is slightly larger (0.7), the male LR is slightly smaller (0.4), the male hypopygium is not provided with an anal point and the style is strongly arcuate. Another allied species may be *Orthocladius macrobrachius* Edwards (probably *Smittia*), from Samoa, but in that species the male hypopygium has the mesal lobe of the coxite situated at about the middle and the male wing has the costa extending nearly halfway to the wing tip from the tip of R_{4+5}, distinctly differing from the present new species. The general appearance of *S. kraussi* is also similar to *S. rectus* Edwards (Europe) except for the whitish halters and the tapered styles of the male hypopygium.

23. **Smittia triangula** Tokunaga, n. sp. (fig. 6, *f*).

Minute species, male dark brown and female yellow and dark brown in general appearance; scutum of male fuscus yellow and with three dark brown vittae and of female yellow and with three very distinct, dark brown vittae. AR 0.55-0.59, last segment of male antenna pubescent on apical two-thirds of non-plumed part, female antenna six-segmented; LR 0.55-0.58 in male and 0.47-0.55 in female; wing with costa not produced beyond tip of R_{4+5}, ending far before wing tip, in male before tip of M_{3+4} and in female above it.

Male: Body 1.27 (1.24-1.3) mm. long; wings 0.81 (0.78-0.85) mm. by 0.24 (0.23-0.25) mm. Generally dark brown. Head with mouthparts yellowish white, eyes separated above by more than 1.5 times length of eye; palp five-segmented (5: 6.8: 12.5: 14.5: 26); antenna entirely dark brown, 14-segmented, last segment subequal to preceding six to seven segments together, slightly clavate apically and with pubescence on apical two-thirds of non-plumed distal part, AR 0.57 (0.55-0.59). Thorax mainly dark brown, scutum with three dark brown vittae and separated by fuscus yellow stripes along fovea and caudoscutal area, scutellum fuscus yellow and with four to six setae. Legs almost entirely pale brown or yellowish brown, but trochanters, femoral bases and tarsi much paler, LR 0.57 (0.55-0.58), RL-FT 22.8: 24. Wing with anal lobe much reduced, costa not produced beyond tip of R_{4+5} and ending slightly beyond tip of Cu_1, RL-V 21.7: 11.7: 22.7: 32.5, fMCu just beyond tip of R_1, R_{4+5} almost straight, Cu_2 slightly beyond fMCu, 1A not reaching it and simple. Halter white. Abdomen dark

brown, tergites with pale spots at setal bases; hypopygium (fig. 6, *f*) yellowish brown, with anal point large, triangular and not produced beyond tergite, coxite spinulous on mesal side and with preapical slender lobe, style slender, slightly arcuate and with basal tuft of four to five small setae.

Female: Body 1.04 (0.83-1.38) mm. long; wings 0.7 (0.65-0.74) mm. by 0.26 (0.23-0.27) mm. General color yellow and dark brown, differing from male. Head dark, but mouthparts pale fuscus, eyes separated above by 1.4 times length of eye; palp five-segmented (5.1: 5.9: 11.6: 13.7: 19.1); antenna entirely dark, six-segmented (8.8: 15.1: 11.6: 11.1: 10.9: 17), intermediate flagellar segments with neck parts shorter than half of segments and sensillae rather stout, but extending slightly beyond distal ends of segments. Thorax with scutum and pleuron yellow, other parts brown, but scutum with three distinct brown vittae, caudoscutal area pale brownish yellow, scutellum with four setae. Legs mainly dark brown, but trochanters and femoral bases yellow, LR 0.52 (0.47-0.55), RL-FT 16.1: 18.6. Wing with anterior veins fuscus, anal lobe almost absent, costa and R_{4+5} gradually fused with each other apically, ending above tip of M_{3+4} and distinctly before wing tip, R_{4+5} almost straight, RL-V 17.1: 6: 16.6+7.4: 27, fMCu slightly beyond tip of R_1. Abdomen with tergites dark, sternites very pale, pleural membranes finely spiculous, cercus white, spermathecae brown.

Holotype, male (US 66540), Koror I., Palau, at light, Apr. 29-30, 1957, Sabrosky. Allotype, female (US), Malakal I., Palau, at light, May 2, 1957, Sabrosky. Paratypes (BISHOP, US, CAS), two males, data same as for holotype; male, E. Ngatpang, Babelthuap I., Palau, light trap, Dec. 9, 1952, Gressitt; female, Ngiwal, Babelthuap I., Palau, at light, May 20, 1957, Sabrosky; three females, Ngaremlengui, Babelthuap I., Palau, at light, June 3, 1957, Sabrosky; female, Koror I., Palau, Sept. 1952, Krauss; female, Koror I., Palau, at light, Apr. 29, 1957, Sabrosky; three females, NE. Koror I., Palau, at light, May 30, 1957, Sabrosky; male, Ulebsehel I., Palau, Sept., 1952, Krauss; two males, Sonsorol I., W. Caroline Is., Sept. 13, 1952, Krauss; female, Arno Atoll, Marshall Is., Feb. 21, 1950, La Rivers.

Other specimens. Palau: Female, SW. Koror I., light trap, Dec. 5, 1952, Gressitt; five females, three males, Koror I., July 24, 1956, McDaniel; 18 females, Ngaremlengui, Babelthuap I., at light, June 1-3, 1957, Sabrosky; male, Ngaiangl I., Dec. 16, 1952, Gressitt.

DISTRIBUTION: Caroline Is. (Palau), Marshall Is. (Arno).

S. triangula is very closely allied to *S. littoralis* Tokunaga (Japan) in the structure of the hypopygium and the coloration, but it may be rather easily distinguished by the simple Cu_2 of the wing and the smaller LR. The general appearance and dimorphic sexual coloration of the present species are common among the species of *Smittia,* but the structure of the male hypopygium is highly specific.

24. Smittia yapensis Tokunaga, n. sp. (fig. 6, *g*).

Minute yellow species with three distinctly brown or yellowish-brown scutal vittae. Antenna of male with yellow plumose hairs, AR about 0.43, intermediate flagellar segments of female with slender neck parts and rather long sensillae; LR 0.62 in male and 0.57-0.65 in female; wing of male with costa ending far before tip of M_{3+4} and not produced beyond tip of R_{4+5}, that of female with costa ending slightly before wing

tip and strongly produced beyond tip of R_{4+5} as long as R_1; pleural membrane of female abdomen spinulous with fine dark spicules.

Male: Body about 1.5 mm. long; wings about 0.87 mm. by 0.27 mm. Generally yellow, three distinct brown scutal vittae. Head brown, mouthparts pale yellow, eyes separated above by 1.3 times length of eye; palp five-segmented (5: 6: 17: 21: 27); antenna brown, with plume yellow, AR 0.43, last segment subequal to preceding five segments together, slightly clavate and pubescent on apical half, RL-A8 as 8: 8 . . . 8: 8: 40. Thorax mainly yellow, scutum with three vittae and caudal margin of caudoscutal area brown, postscutellum dark brown, pleuron and sternum yellowish brown, scutellum with two large median and four small lateral setae. Legs with coxae yellowish brown, other segments very pale yellow, LR about 0.62, RL-FT 24: 26. Wing with veins very pale, anal lobe much reduced, costa not or just produced beyond tip of R_{4+5} and ending far before tip of M_{3+4}, R_{4+5} almost straight, RL-V 22: 12: 24: 35, fMCu under tip of R_1, M_{3+4} and Cu_1 almost straight, Cu_1 atrophied under fMCu, 1A ending under r-m. Halter white. Abdomen yellowish pale brown and slightly fuscus; hypopygium (fig. 6, *g*) pale brownish yellow, anal point absent, coxite sparsely setigerous with small setae on mesal side, lobe long, somewhat pointed and fringed with several setae only on anterior side, style slender, about twice as long as lobe of coxite or 0.6 length of coxite, slightly arcuate, and with tuft of two small setae on subbasal part.

Female: Body length 1.29 (1.27-1.3) mm.; wing 0.81 (0.75-0.86) mm. by 0.27 (0.25-0.3) mm. Generally far more yellowish than male. Head yellowish brown, mouthparts pale yellow, eyes slightly more widely separated above than length of eye; palp five-segmented (6.3: 7.3: 14.7: 24.7: 25.7); antenna with scape yellow or yellowish brown, other segments more or less fuscus or brown, six-segmented (9: 16.2: 12.8: 14.5: 14: 28), intermediate flagellar segments with neck parts about one-third of segments or slightly more and with rather long sensillae. Thorax with three scutal vittae, caudoscutal area, postscutellum, and pleural sclerites yellowish brown, sternum mainly yellow but lateral sides with faint brownish stripes. Legs mainly pale brownish yellow or slightly fuscus pale brown, but trochanters and basal one-third of femora very pale yellow or white, LR 0.6 (0.57-0.65), RL-FT 22.3: 24.4. Wing with anterior veins slightly fuscus, costa strongly produced beyond tip of R_{4+5} as long as R_1 and ending halfway to wing tip, RL-V 19: 9: 24.3: 30, fMCu under tip of R_1, R_{4+5} ending above tip of M_{3+4}. Abdomen extensively yellow, tergites fuscus, sternites paler, pleural membranes with dense minute dark spicules; cercus pale yellow, spermathecae very pale yellow.

Holotype, male (US 66541), Rumung I., Yap, at light, June 17, 1957, Sabrosky. Allotype, female (US), Gachapar, Gagil, Yap, at light, June 19, 1957, Sabrosky. Paratypes, female, Ton I., Truk, Apr. 7, 1949, Potts; female, Majurirok I., Jaluit Atoll, Marshall Is., from *Hernandia* flowers, Apr. 26, 1958, Gressitt.

Other specimen. Marshall Is.: Male, Ine I., Arno Atoll, June 21, 1950, La Rivers.

DISTRIBUTION: Caroline Is. (Yap, Truk), Marshall Is. (Jaluit, Arno).

The structure of the male hypopygium of the present species is very similar to that of *S. triangula,* but the coloration and venation of the female wing are distinctly different.

25. **Smittia micronesiana** Tokunaga, n. sp. (figs. 5, *c, h*; 6, *h*).

Minute yellow and brown species with three distinct scutal vittae. Antenna of male with last segment as long as preceding five segments together and pubescent on apical half, AR 0.41-0.49, of female with intermediate flagellar segments with neck parts and

sensillae short and stout. LR 0.53-0.58 in male and about 0.5 in female. Wing of male with costa not produced beyond end of R_{4+5} and ending before tip of M_{3+4}; of female with costa strongly produced and almost 1.7 times length of R_1, ending slightly before wing tip; in both sexes no addition fork in anal cell.

Male: Body 1.51 (1.43-1.67) mm. long; wings 0.91 (0.83-0.95) mm. by 0.27 (0.25-0.28) mm. Head yellow or pale brownish yellow, mouthparts almost white, eyes separated above by 1.7 times length of eye; palp five-segmented (5.7: 7: 15.7: 20: 30.3); antenna with scape brown, other segments pale brown, 14-segmented, AR 0.45 (0.41-0.49), last segment (fig. 5, *c*) very slightly thickened, subequal to preceding five segments together, with apical half not plumed but pubescent. Thorax: Scutum yellow and with three distinctly brown vittae, scutellum pale brown, with two large median and four to five small lateral setae, postscutellum brown, pleural and sternal sclerites yellow or pale brown. Legs almost entirely yellow or pale brownish yellow; LR 0.55 (0.53-0.58), RL-FT 27.6: 29.3. Wing (fig. 5, *h*) with veins very pale brown, anal lobe slightly developed, costa not produced, ending far before tip of M_{3+4}, R_1 and R_{4+5} slightly upcurved, fMCu just beyond tip of R_1, Cu_2 atrophied just before and IA far before fMCu, M_{3+4} and Cu_1 only slightly arcuate, RL-V 25 : 12.3 : 26.3 : 37.7. Halter white. Abdomen yellowish brown or brown, hypopygium (fig. 6, *h*) paler, with anal point minute and triangular, coxite slender, with five apical setae arranged in longitudinal line on apical part of dorsal side, mesal side spinulous on distal half, lobe situated on apical part of mesal side, projected caudad, rather small, subtriangular and spiculous on mesal side, distal end of coxite slightly concave and finely pubescent, style very slender, half as long as coxite and slightly arcuate.

Female: Body about 1.43 mm. long; wings about 0.8 mm. by 0.29 mm. General appearance as in male, but wing much different with costa strongly produced. Eyes separated above by 1.3 times length of eye; palp five-segmented (about 7: 8: 14: 15: 24); antenna with scape yellowish pale brown, other segments fuscus pale brown, six-segmented (10: 15: 11: 11: 12: 20), intermediate flagellar segments with neck parts stout, sensillae short, rather thick and not beyond segments. Thorax as in male, but caudoscutal area dark brown, scutellum brown, pleuron and sternum fuscus brown. Legs with coxae fuscus brown, trochanters and femoral bases yellow, other parts and segments uniformly pale brownish yellow, LR about 0.5, RL-FT 22.5: 24. Wing with anterior veins fuscus, anal lobe almost absent, costa strongly produced far beyond R_1 and ending slightly before wing tip, R_{4+5} ending slightly beyond tip of M_{3+4}, RL-V 19: 5: 25: 30, fMCu slightly beyond tip of R_1. Abdomen extensively yellow, but all tergites dark brown and with pale spots at bases of setae, cercus white, spermathecae very pale brown.

Holotype, male (US 66542), Wena (Moen) I., Truk, Feb. 9, 1948, Maehler. Allotype, female (US), data same as for holotype. Paratypes (BISHOP, CAS, US), two males, data same as for holotype; two males, Tonas I., Truk, at light, Maehler; four males, Angaur I., Palau, Feb. 4, 1948, Dybas; 16 males, Ine I., Arno Atoll, Marshall Is., by sweeping, June 13, 1950, La Rivers; four males, Arno Atoll, Marshall Is., June 21, 1950, La Rivers.

Other specimens. Truk: Seven females, Wena I., Truk, Feb., 1954, Beardsley. Marshall Is.: Male, Ine I., Arno Atoll, June 21, 1950, La Rivers.

DISTRIBUTION: Caroline Is. (Palau, Truk), Marshall Is. (Arno).

This species is very similar to *yapensis* in general appearance, especially in the structures of the male hypopygium and male antennae; however, it may be distinguished from *yapensis* by the slight differences of the LR and the shape of the lobe of the male coxite and by the structures of the female antenna.

26. Smittia zonata Tokunaga, n. sp. (figs. 5, *d, i, j;* 6, *i*).

Minute yellow species; abdomen of male with large brownish oval spots on dorsal side of segments 2 to 5, tergite 8 entirely brownish; of female with very faint fuscus bandlike spots on tergites 2 to 7 or 8. Male with AR 0.33-0.38, distal two or three antennal segments incompletely segmented, ultimate segment swollen before apex, female antenna with intermediate flagellar segments oval and sensillae stout. Wing with costa strongly produced beyond tip of R_{4+5} reaching halfway to wing tip. LR 0.41-0.45 in male and 0.47-0.5 in female.

Male: Body length 1.41 (1.37-1.46) mm.; wings 0.89 (0.87-0.91) mm. by 0.28 (0.27-0.29) mm. Head usually yellow and sometimes slightly brownish, mouthparts far paler, eyes separated above by 1.2 times length of eye; palp five-segmented (5.5: 6: 10: 13.5: 19.3); antenna (fig. 5, *d*) with last two or three segments incompletely separated, ultimate segment subequal to preceding four together, with only several verticils on basal part, broadened preapically and pubescent on apical one-third to one-fourth, AR 0.35 (0.33-0.38). Thorax yellowish brown, but anterior margin of scutum more brownish, sternum far more brownish, scutellum with three to four setae. Legs mainly pale yellow, with coxae yellowish brown, fore femur and basal half of fore tibia slightly more brownish, LR 0.43 (0.41-0.45). Wing (fig. 5, *i*) with costa strongly produced beyond tip of R_{4+5} reaching halfway to wing tip, R_{4+5} ending before tip of M_{3+4}, fMCu slightly before or beyond tip of R_1, Cu_1 strongly undulate, RL-V 23.8: 10: 23.8: 32, anal lobe quite absent. Halter yellowish white. Abdomen yellow and with large, pale-brown, oval spot on tergites 2 to 5, segment 8 entirely pale brown; hypopygium (fig. 6, *i*) yellow, anal point and lobe of coxite absent, coxite tapered and finely pubescent on mesal side, style large, clavate, about half as long as coxite, with apical spine dark.

Female: Body 1.18 (0.86-1.4) mm. long; wings 0.75 (0.7-0.82) mm. by 0.27 (0.25-0.3) mm. General appearance far paler than male. Head yellow, with clypeus pale brown, eyes widely separated above by about 1.5 times length of eye; palp with five segments about 5: 6.5: 12.8: 15.8: 22.8; antenna entirely yellowish pale brown, six-segmented (9.3: 14: 10: 10.8: 10.6: 19.8), intermediate flagellar segments oval, with sensillae stout and slightly shorter than half of segments. Thorax with indistinct, yellow scutal vittae, scutellum with four to five setae. LR 0.49 (0.47-0.5). Wing (fig. 5, *j*) with anal lobe slightly developed, venation mainly as in male, R_{4+5} ending above tip of M_{3+4}, fMCu under tip of R_1, Cu_1 not undulate, RL-V 17.4: 9: 22: 26.8. Abdomen yellow, tergites 2 to 6 or 7 with very faint, pale brown and bandlike clouds, tergite 9 with pair of specific tubercles on lateral sides small, cylindrical, dark and bearing single apical small seta, cerci yellow, spermathecae pale yellow.

Holotype, male (US 66543), Ngiwal, Babelthuap I., Palau, at light, May 19-20, 1957, Sabrosky. Allotype, female (US), SW. Koror I., Palau, light trap, Dec. 5, 1952, Gressitt. Paratypes (BISHOP, US), two males, data same as for holotype; two females, data same as for allotype; four males, Ngaremlengui, Babelthuap I., Palau, light trap, June 1-3, 1957, Sabrosky; female, Hare I., Kapingmarangi Atoll, E. Caroline Is., Aug. 3, 1946, Townes; female, NE. Koror I., Palau, at light, May 30, 1957, Sabrosky.

Other specimens. S. Mariana Is.: Male, Rota I., Feb. 4, 1953, Beardsley. Palau: Two females, two males, Ngaremlengui, Babelthuap I., at light, June 1-3, 1957, Sabrosky; three males, data same as for allotype; female, eight males, Koror I., at light, May 2, 16, 29, 1957, Sabrosky; two males, Koror I., at light, Oct. 5, 1952 and May 31, 1953, Beardsley; two females, Koror I., Sept. 16, 1952, Beardsley; female, male, Koror I., July 24, 1956, McDaniel;

male, NE. Ngurukdabel I., Dec. 5, 1952, Gressitt; female, Peleliu I., May 28, 1957, Sabrosky; male, Ngaiangl I., May 9, 1957, Sabrosky. Yap: Female, Dugor, Yap I., Aug. 14, 1950, Goss; female, Dugor, Weloy, Yap I., June 14, 1957, Sabrosky. Ponape: Male, Mt. Temwetemwensekir, 180 m., Jan. 17, 1953, Gressitt; two males, SE. Nanpohnmal, Jan. 8-12, 1953, Gressitt. Kusaie: Female, Mt. Matante, 580 m., at light, Mar. 26, 1953, Clarke.

DISTRIBUTION: S. Mariana Is. (Rota), Caroline Is. (Palau, Yap, Ponape, Kusaie).

Camptocladius flavus Kieffer (India), which seems similar to the present species in general appearance, was described from a female which is almost certainly lost and, unfortunately, the description is too brief to identify the species. The general appearance and the male hypopygium of this species are somewhat similar to those of *Cricotopus,* but obviously it belongs to *Smittia* and somewhat resembles *S. harrisoni* Freeman (Africa) from which it may be easily distinguished by the position of the dark abdominal bands, the far smaller AR and LR, and the absence of the anal point and the lobe of the coxite of the male hypopygium.

27. Smittia insulsa Johannsen (figs. 5, *e, k, l*; 7, *c*).

Smittia (*Pseudosmittia*) *insulsa* Johannsen, 1946, B. P. Bishop Mus., Bull. **189**: 191.

Very small species, male mainly black, female yellow and dark brown, with three dark, distinct scutal vittae. AR 0.8-1.07, antenna of male distinctly capitate apically, of female with intermediate flagellar segments oval, neck parts indistinct; LR of male 0.62-0.74, of female 0.53-0.59. Wing of male with costa slightly produced and ending at basal one-third of wing, R_{4+5} ending before tip of M_{3+4}; wing of female with costa strongly produced, reaching almost to wing tip.

Male: Body 1.58 (1.0-2.15) mm. long; wings 1.01 (0.91-1.11) mm. by 0.25 (0.25-0.26) mm. Head dark, mouthparts white, eyes separated above by 1.67 times length of eye; palp five-segmented (about 6: 8.3: 16.7: 18.3: 28); antenna entirely black, last segment (fig. 5, *e*) strongly swollen apically and with apical pubescence, AR 0.98 (0.8-1.07). Thorax almost entirely black, not shiny, pleural membranes yellowish brown, scutellum with four large median and four small lateral setae. Legs with coxae dark, trochanters, basal half of femora and of fore tibia slightly fuscus, other segments entirely white; LR 0.68 (0.62-0.74), RL-FT 25.7: 27.6. Wing (fig. 5, *k*) with costa slightly beyond tip of R_{4+5}, ending far beyond tip of M_{3+4}, reaching at basal one-third to wing tip from tip of R_{4+5}, produced about one-third to two-fifths of R_1, R_{4+5} ending before tip of M_{3+4}, fMCu under or just beyond tip of R_1, RL-V 27.3: 15.2: 29.5: 44. Halter white. Hypopygium (fig. 7, *c*) with tergite dark, other parts white, but slightly fuscus at bases of coxites, anal point long, black and spinulous; coxite arcuate, broad at middle, with mesal lobe small, round, sparsely setigerous and located just beyond middle; style rather slender, about 0.45 as long as coxite and 1.5 as long as anal point, almost straight but slightly angulated subbasally and tapered.

Female: Body 1.45 (1.3-1.59) mm. long; wings 0.9 (0.88-0.91) mm. by 0.31 (0.3-0.33) mm. Coloration yellow and dark brown differing from entirely dark brown male. Head brown, mouthparts white, eyes separated above by 1.36 times length of eye; palp five-segmented (7: 8: 16.2: 17.3: 24.3); antenna six-segmented (11: 15.5: 12: 12.3: 12: 21.5); scape dark brown, flagellum yellowish brown but apical one-third of each segment fuscus, last segment fuscus pale brown; intermediate flagellar segments oval,

with neck parts indistinct and sensillae slender and rather small. Thorax extensively fuscus pale brown or yellowish, scutum with three vittae dark brown, sternum fuscus brown, scutellum pale brown, postscutellum brown. Legs with coxae brown, other segments all white; LR 0.56 (0.53-0.59), RL-FT 22.8: 24.5. Wing (fig. 5, *l*) with costa strongly produced longer than R_1, ending almost at wing tip, R_{4+5} ending above tip of M_{3+4}, RL-V 21.7: 10.7: 26.7: 34. Abdomen fuscus pale brown, but pleural membranes fuscus yellow or yellow, cercus white, spermathecae pale brown.

DISTRIBUTION: S. Mariana Is., Caroline Is.

S. MARIANA IS. SAIPAN: Four females, four males, Lake Susupe, Jan. 1949, Maehler; two females, three males, Chalan Kanoa, light trap, Jan. 1949, Maehler; three females, three males, near Lake Susupe, Mar. 1945, Dybas; female, near Garapan, Jan. 1945, Dybas; female, Talofofo, Jan. 1945, Dybas. TINIAN: Six males, Lake Hagoi, June 1946, Townes; female, Lake Hagoi, Apr. 1945, Dybas; female, NW. slope, Mt. Lasso, Apr. 1945, Dybas; female, male, Marpo Valley, Oct. 1945, Ducoff. GUAM: Two males, Mt. Lamlam, Oct. 1952, Krauss.

PALAU. BABELTHUAP: Male, Ulimang, Dec. 1947, Dybas; male, Ngaremlengui, June 1957, Sabrosky.

As the original description of this species is incomplete for the modern classification of the group, I have redescribed it here.

28. **Smittia tuberculifera** Tokunaga, n. sp. (figs. 5, *f*, *m*; 7, *d*).

Very small species, male mainly brown or dark brown, female yellowish or very pale brown; male with scutum almost entirely brownish, female with scutal vittae yellow on yellowish-white ground color. AR 0.57-0.67, last antennal segment of male slightly clavate, LR 0.69-0.75 in male and about 0.59 in female. Wing of male with costa strongly produced beyond tip of R_{4+5} and ending at distal two-thirds to wing tip (tip of M_{1+2}), wing of female with costa produced as long as R_1 and ending very slightly before or almost at wing tip.

Male: Body 1.67 (1.56-1.76) mm. long; wings 1.05 (1.0-1.12) mm. by 0.3 (0.28-0.33) mm. Head dark brown, with mouthparts brown, eyes separated above by about twice length of eye; palp five-segmented (6: 8: 16.2: 15.6: 22.8); antenna (fig. 5, *f*) with last segment subequal to preceding seven or eight segments together, plumed on basal three-fourths, apically slightly clavate and pubescent only at apex, AR 0.64 (0.57-0.67). Thorax mainly dark brown, lateral margins of scutum yellow, scutellum yellowish brown and with two large median and two to four small lateral setae. Legs with coxae brown, other segments yellowish pale brown but fore tibia and bases of mid and hind femora more fuscus; LR 0.72 (0.69-0.75), RL-FT 20.9: 34.3. Wing (fig. 5, *m*) with veins very pale yellow, anal lobe not highly reduced, costa strongly produced as long as two-sevenths of R_{4+5}, ending just before wing tip and reaching basal two-thirds to wing tip from tip of R_{4+5}, R_1 and R_{4+5} slightly upcurved, R_{4+5} ending just beyond or above tip of M_{3+4}, fMCu under middle of R_1. Halter pale brownish white to white. Abdomen mainly brown, basal two or three segments paler and posterior two or three segments darker; hypopygium (fig. 7, *d*) brown or fuscus brown, with anal point minute; coxite slender, with mesal lobe oval, sparsely setigerous and situated at middle; style thick, almost straight, not tapered or arcuate, about half as long as coxite and with apical spine flattened.

Female: Body about 1.31 mm.; wings 0.99 mm. by 0.31 mm. General appearance yellow and pale brownish yellow, abdominal tergites with large fuscus clouds rhombic on anterior segments and subtriangular on posterior. Head with vertex dark, mouthparts pale fuscus, frons white, eyes separated above by about 1.3 times length of

eye; palp five-segmented (4.5: 6.5: 15.5: 15: 24); antenna with scape yellow, other segments mainly brown or fuscus, but subbasal parts where verticils arise yellow, segments three to five with neck parts very short, indistinct and at most one-fourth as long as segments, sensillae short, stout, and at most only just beyond apices of segments. Thorax mainly yellow, scutum with three vittae yellowish brown or yellow and indistinct, somewhat brownish on caudoscutal area along caudal margin and sometimes on anterior part along anterior margin, yellowish white on shoulder parts, postscutellum fuscus yellow but caudal margin yellow, scutellum and pleuron pale yellow, sternum yellow or slightly fuscus. Legs mainly fuscus pale brown, coxae yellowish brown,

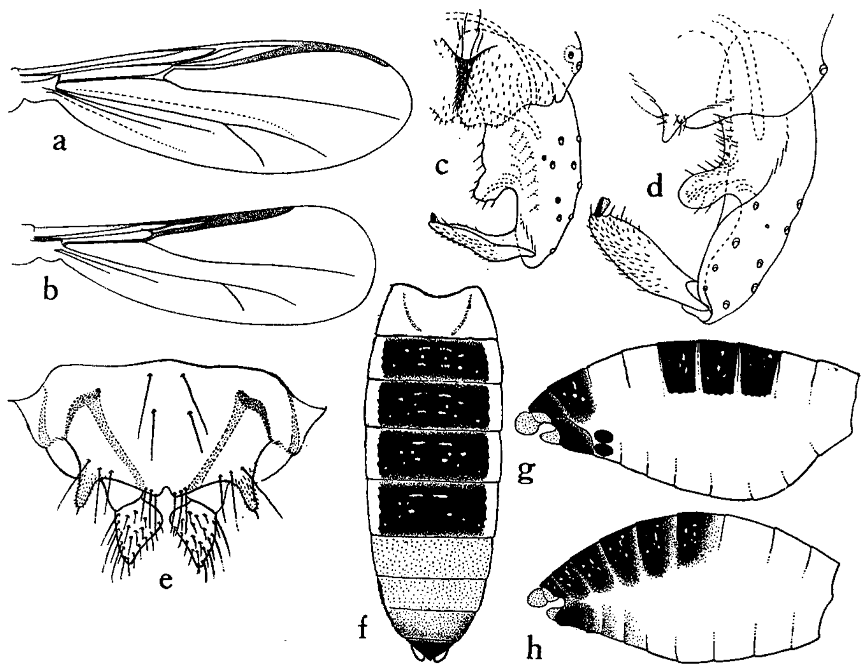


FIGURE 7.—*Smittia* spp.: **a,** *S. bicinctura,* female wing; **b,** *S. fusivenosa,* female wing; **c,** *S. insulsa,* male hypopygium, **d,** *S. tuberculifera,* male hypopygium; **e,** *S. guamensis,* female abdominal tip, dorsal aspect; **f,** *S. postcinctura,* female, abdominal tergal markings; **g,** *S. bicinctura,* female, abdominal markings; **h,** *S. fusivenosa,* female, abdominal markings.

trochanters and femoral bases yellow; LR about 0.59, RL-FT about 23.3: 24.8, RL-T of hind leg 52.5: 24: 25.5: 10: 8. Wing with anterior veins fuscus, costa strongly produced as long as R_1 and almost reaching wing tip, fMCu just beyond tip of R_1, R_{4+5} ending distinctly beyond tip of M_{3+4}, Cu_1 slightly curved, Cu_2 ending under fMCu, 1A slightly beyond r-m, RL-V 25: 11: 34: 39.5. Abdomen very pale brown, but tergites with large rhombic and triangular fuscus clouds, sternites with two fuscus lateral stripes, pleural membranes finely spiculous; cercus yellow, spermathecae brown.

Holotype, male (US 66544), Ton I., Truk, May 24, 1946, Oakley. Allotype, female (US), Mt. Lamlam, Guam, Oct. 1952, Krauss. Paratypes

(BISHOP, US), two males, Futami-ko, Chichi Jima, Bonin Is., May 10, 1956, Clagg; male, Koror I., Palau, July 24, 1956, McDaniel; two males, Koror I., Palau, at light, Apr. 29 and May 20, 1957, Sabrosky; five males, Ngaremlengui, Babelthuap I., Palau, light trap, June 1-3, 1957, Sabrosky; two males, Netkeng, Imeliik, Babelthuap I., Palau, June 6, 1957, Sabrosky; female, Mt. Unibot, Ton I., Truk, 25-50 m., in lower native forest, Jan. 1, 1953, Gressitt.

Other specimens. Palau: Three females, male, Ngaremlengui, Babelthuap I., at light, June 1, 1957, Sabrosky; male, Melekeiok, Babelthuap I., May 22, 1957, Sabrosky. Truk: Male, Mt. Unibot, Ton I., 390 m., Feb. 4, 1953, Gressitt. Ponape: Male, Mt. Temwetemwensekir, light trap, Jan. 15, 1953, Gressitt. Kusaie: Male, Mutunlik, light trap, Jan. 24, 1953, Gressitt; male, Mwot, light trap, Apr. 10, 1953, Clarke.

DISTRIBUTION: Bonin Is. (Chichi Jima), S. Mariana Is. (Guam), Caroline Is. (Palau, Truk, Ponape, Kusaie).

This is very closely allied to the marine *Trichocladius fucicola* Edwards (Europe) and *Dactylocladius mahensis* Kieffer (Seychelles). However, *fucicola* has densely pubescent eyes, the costa only slightly beyond the tip of R_{4+5} in the male, the male hypopygium without an anal point, and the female antenna seven-segmented. *D. mahensis* has the AR a little larger (0.9) than *tuberculifera*.

29. **Smittia guamensis** Tokunaga, n. sp. (fig. 7, *e*).

Minute fuscus species, female with three brown scutal vittae distinct on yellowish-white ground color; female antenna with intermediate flagellar segments oval, sensillae rather short; LR about 0.52 in female; wing with costa only just beyond tip of R_{4+5} and ending just beyond tip of M_{3+4}; abdomen slightly fuscus and with small caudal tubercles on segment 9.

Female: Body 0.88-0.91 mm. long; wings 0.62-0.69 mm. by 0.21-0.25 mm. Generally more or less fuscus. Head dark, but frons and mouthparts pale fuscus, clypeus dark, with eyes separated above by about 1.5 times length of eye; palp five-segmented (4.5: 5: 9.3: 12: 19); antenna almost entirely dark or with scape yellowish, six-segmented (8: 13: 9: 9: 9: 17), intermediate flagellar segments oval, with sensillae rather short and slightly longer than half of segments. Scutum yellow, with three distinct brown vittae, triangular caudoscutal spot pale brown, shoulder parts white, scutellum pale brown, with two long median and two minute lateral setae, postscutellum brown, pleuron pale brownish yellow and with brown spot under wing bases, pleural membranes yellow, sternum with large brown spot at middle. Legs fuscus pale brown, trochanters and femoral base pale yellow or white; LR about 0.52, RL-FT 16:17. Wing with anterior veins fuscus, costa ending far before wing tip, just beyond tip of M_{3+4}, gradually approximating to R_{4+5} apically, and slightly produced beyond tip of R_{4+5} as long as half of R_1, R_1 ending above fMCu, R_{4+5} almost straight and ending before tip of M_{3+4}, Cu_1 not undulate, Cu_2 atrophied before fMCu, 1A ending slightly beyond r-m, RL-V 15.5: 6.5: 18.5: 24.5, anal lobe very narrow and its angle very obtuse. Halter very pale fuscus. Abdomen almost entirely fuscus, tergites uniformly more fuscus than paler or somewhat yellowish sternites, but with pale spots at setal bases, pleural membrane entirely finely spinulous, cercus fuscus yellow, tergite 9 with lateral tubercles (fig. 7, *e*) pubescent and bearing apical seta, spermathecae pale brown.

Male: Unknown.

Holotype, female (US 66545), Mt. Lamlam, Guam, Oct. 1952, Krauss. Paratype, female, Mt. Lamlam, Guam, July 1952, Krauss.

DISTRIBUTION: S. Mariana Is. (Guam).

Although the male is unknown, the highly characteristic female so obviously differs from the other species, except *zonata,* in possessing cylindrical caudal tubercles that it is justifiable to describe it as a new species. The marine *S. littoralis* Tokunaga (Japan) is similar to this species, but its wing is provided with an extra forked vein in the anal cell, unlike the Guam species.

30. Smittia bicinctura Tokunaga, n. sp. (figs. 7, *a, g*).

Minute yellow and dark-brown species, female with thorax mainly brown, but scutum and scutellum almost entirely yellow, abdomen extensively yellow, but tergites 3 to 5 black, segments 8 and 9, including cerci, dark to brownish. Female LR only 0.36, female hind tarsal segment 3 longer than 2, wing of female with costa beyond tip of R_1 and R_{4+5} thickened, costa beyond tip of R_{4+5} and apical half of R_{4+5} fuscus, costal projection very long and about twice as long as R_1.

Female: Body about 1.3 mm. long; wings 0.79 mm. by 0.27 mm. Head dark brown, with mouthparts yellow, eyes separated above by more than length of eye; palp as long as head capsule and five-segmented (6: 6: 12: 18.5: 24); antenna with scape yellow, flagellum missing. Scutum almost entirely yellow, pale brown only along caudal margin and with only five erect small setae on each fovea, scutellum yellow and with four minute setae, postscutellum brown on anterior and yellow on posterior half, pleuron and sternum brown, pleural membranes yellow. Legs with coxae brown, trochanters, femora and hind tibia yellowish pale brown, other segments pale brown and slightly fuscus; LR about 0.36, RL-FT 19: 22.5, RL-T of hind leg 40: 21: 24: 9: 10. Wing (fig. 7, *a*) with anterior veins very pale fuscus, but distal part of costa beyond R_{4+5} and apical part of R_{4+5} more fuscus, distal part of costa beyond R_1 and R_{4+5} thickened, anal lobe almost absent, R_1 very short, about one-third of R_{4+5}, costa strongly produced beyond tip of R_{4+5} reaching basal two-thirds to wing tip and far beyond tip of M_{3+4}, R_{4+5} ending before tip of M_{3+4}, fMCu under tip of R_1, Cu_1 bent at middle, RL-V 19: 7: 21: 26. Halter white. Abdomen (fig. 7, *g*) mainly yellow, with obvious black tergites 3 to 5, segment 8 black, 9 dark or brownish yellow, cercus brownish yellow, spermathecae dark brown.

Male: Unknown.

Holotype, female (US 66546), SW. Koror I., Palau, 25 m., light trap, Dec. 5, 1952, Gressitt.

DISTRIBUTION: Caroline Is. (Palau).

Though the male is unknown, the female is highly specific in the venation of the wing and the bicolored abdomen and thorax. This species shows superficial resemblances to *Cricotopus,* but differs in that the eyes are quite bare and the costa is strongly produced.

31. Smittia postcinctura Tokunaga, n. sp. (fig. 7, *f*).

Minute yellow and brown species, very similar to *bicinctura,* from which it may be easily distinguished by entirely yellow dorsal side of thorax including postscutellum, hind tarsal segment 3 longer than 2, tergites 2 to 5 dark instead of 3 to 5, and caudal tubercles of abdomen absent.

Female: Body about 1.13 mm. long; wings 0.83 mm. by 0.31 mm. Head brown, with mouthparts white, eyes separated above by length of eye; palp five-segmented

(6: 6: 11: 10: 21.5), basal four segments round to oval, last segment very slender; antenna entirely brown, intermediate flagellar segments flasklike, with neck parts dark and long, sensillae also long, last segment dark and slender, six segments (about 9: 20: 17: 19: 16.5: 34). Thorax with tergal sides entirely yellow, except for fuscus anterior tip, pleuron and sternum fuscus, pleural membrane yellow, scutellum with two large median and two small lateral setae. Legs brown, but trochanters paler, LR 0.41, RL-FT 18: 22, RL-T of hind leg 49: 19: 24.5: 10: 12. Wing similar to that of *bicinctura*, with costa strongly produced beyond tip of R_{4+5}, as long as one and four-ninths of R_1, reaching almost to wing tip, R_{4+5} ending above tip of M_{3+4}, fMCu slightly before tip of R_1, Cu_1 not undulate, ending just beyond tip of R_1, Cu_2 extending far beyond fMCu, RL-V 21: 9: 22: 29. Halter white. Abdomen (fig. 7, *f*) with sternites pale yellow and slightly more brownish on caudal segments, tergite 1 white and with paired dark spots, tergites 2 to 5 black, 6 to 7 pale brownish yellow, 8 and 9 dark on lateral sides and brown on middle part, pleural membranes pale brownish yellow, cercus pale yellow.

Male: Unknown.

Holotype, female (US 66547), Melekeiok, Babelthuap I., Palau, at light, May 22, 1957, Sabrosky.

DISTRIBUTION: Caroline Is. (Palau).

Although the male is not known, the female of this species is specific in the coloration of the abdomen and closely allied to *bicinctura*, from which it may be easily separated by the absence of the caudal abdominal tubercles, hind tarsal segment 3 being longer than 2 and the dark abdominal tergite 2.

32. **Smittia fusivenosa** Tokunaga, n. sp. (fig. 7, *b, h*).

Minute dark and yellow species somewhat resembling *Corynoneura*. Thorax entirely dark brown, abdomen yellow on basal three segments and sternite 4, dark brown on other posterior segments. LR 0.47, hind tarsal segment 3 subequal to 2; wing with R_1 very short and only slightly longer than r-m, R_{4+5} straight and distal half fused with costa, forming a thick, dark vein, costa not produced beyond tip of R_{4+5} and ending at apical fourth of wing.

Female: Body about 0.87 mm. long; wings about 0.61 mm. by 0.21 mm. General appearance very minute, dark and yellow. Head dark brown, with mouthparts white, eyes separated above by length of eye; palp far shorter than head capsule (7: 12), five-segmented (4: 4: 6: 7: 12), basal two segments round, following two oval, last one very slender; antenna dark brown, flagellum missing. Thorax entirely dark brown, scutum with only five small setae on each fovea, scutellum with only two setae. Legs with coxae fuscus pale brown, other segments yellowish pale brown, fore femur slightly more fuscus; LR 0.47, RL-FT 15: 17, RL-T of hind leg 32: 16: 17: 6.5: 9. Wing (fig. 7, *b*) with membrane pale gray, veins very pale, but costa beyond R_1 and R_{4+5} fuscus, anal lobe absent, costa ending at apical fourth of wing length, R_1 very short and only slightly longer than r-m (3.5: 2), R_{4+5} fused with costa on apical half and straight, RL-V 12.5: 3.5: 20: 24, R_{2+3} invisible, fMCu under middle of R_{4+5}, two branches of M, 2 Cu, and 1 A widely atrophied on distal parts. Halter white. Abdomen (fig. 7, *h*) distinctly bicolored, basal three segments and sternite 4 entirely yellow, other posterior segments dark brown, but sternite 5 brown; cercus brown, spermathecae very pale brown.

Male: Unknown.

Holotype, female (BISHOP 3372), Tonoas I., Truk Is., Dec. 20, 1935, Ono.

DISTRIBUTION: Caroline Is. (Truk).

Although the male of *fusivenosa* is unknown, the female is quite specific in the bicolored abdomen and the fused anterior wing veins. *S. conjunctus* Edwards (Britain) is very similar, but in that species the wings are rather more short oval than those of *fusivenosa* and wing vein R_1 is relatively longer, about one-third to one-fourth of R_{4+5}. *S. fusivenosa* shows affinities to species of *Corynoneura,* but differs in that the eyes are quite bare, the hind tibiae are simple and the wings are not provided with the false vein along costal margin.

33. **Smittia** sp. No. 1.

Minute yellow species very similar to *S. zonata* in general appearance, but distinctly differing in short costal projection beyond tip of R_{4+5}, long and slender sensillae of flagellar segments and uniformly fuscus abdomen.

Female: Body length 0.88 mm.; wings 0.72 mm. by 0.27 mm. Head yellow, with mouthparts white, apical half of clypeus pale brownish yellow, eyes separated above by 1.5 times length of eye; palp five-segmented (5: 5.5: 10: 12: 19); antenna with scape yellowish brown, flagellum pale brown, intermediate flagellar segments elongate oval, with slender sensillae. Thorax entirely yellow, with shoulder parts of scutum white, scutellum with four setae. Legs almost entirely yellowish white, LR 0.5, RL-FT 16.5: 19, RL-T of hind leg 46: 21: 24: 10: 11. Wing with veins almost colorless, costa ending far before wing tip, above tip of M_{3+4} and indistinctly produced beyond tip of R_{4+5}, R_{4+5} gradually approximate to costa apically, fMCu beyond tip of R_1, median branches and cubital veins atrophied far before wing margin, anal veins very short, RL-V 16.5: 7: 20: 28, anal lobe very small. Halter white. Abdomen almost uniformly pale fuscus, with cercus white, spermathecae colorless and hyaline.

Male: Unknown.

DISTRIBUTION: Caroline Is.

PALAU. KOROR: Female, July 1956, McDaniel.

This female may be the same as *Camptocladius flavus* Kieffer from India, but it is impossible to identify that species from the inadequate original description.

34. **Smittia** sp. No. 2.

Minute yellow species, close to *zonata* in general appearance, but more brownish or fuscus, with intermediate flagellar segments bearing more slender sensillae, thorax pale brownish and with three scutal vittae very pale brown and hind tarsal segment 3 far longer than 2.

Female: Body 1.14 mm. long; wings 0.81 mm. by 0.3 mm. Head yellow, but vertex and apical half of clypeus pale brown, eyes separated above by about 1.5 times length of eye; palp pale brown, five-segmented (8: 7: 16: 21: 24); antenna with scape yellow, other segments pale brown, six-segmented (8: 13: 9: 10.5: 10: 20), segments 3 to 5 oval, with sensillae slender. Thorax mainly yellow, scutum with three very pale brown vittae, scutellum also very pale brown, with two large median and four small lateral setae, postscutellum pale brown. Legs slightly brownish yellow, LR 0.48, RL-FT 23: 25, RL-T of hind leg 59: 26: 29: 12: 13. Wing with anterior veins very pale brown, anal lobe almost reduced, costa produced beyond R_{4+5}, almost as long as R_1 (8: 10), ending beyond M_{3+4} and slightly before wing tip, fMCu under tip of R_1, RL-V 19: 10: 26: 32, Cu_1 slightly arcuate, Cu_2 ending under fMCu, 1A ending just beyond r-m. Halter pale brownish yellow. Abdomen with tergites entirely fuscus, other parts yellow, pleural membranes finely spinulous; cercus yellow, spermathecae brown.

Male: Unknown.

DISTRIBUTION: Caroline Is.

PALAU. KOROR: Female, light trap, May 1957, Sabrosky.

SUBFAMILY CLUNIONINAE

Synonym: Campontiinae.

Antennae of male never plumose, antennae of both sexes often similar. Pronotum completely divided into lateral lobes, postnotum without distinct median keel or furrow; anepisternal suture absent or rudimentary. Legs usually elongate; hind legs especially long, fore coxae enlarged, first tarsal segment of fore leg shorter than tibia, fore and hind tibial spurs present, but without combs. Wings often reduced, when developed, without macrotrichia on membrane; m-cu absent; venation as in Orthocladiinae, but R_{2+3} almost invisible. Male hypopygium usually rotated or inverted, with styles infolded, and without distinct apical spine.

Mainly marine in habitat.

KEY TO GENERA OF CLUNIONINAE

1. Hind tarsus with segment 2 not longer than 3; all tarsi with segment 4 cylindrical and simple, 5 simple and never trilobate; antennae 4- to 10-segmented, often sexually dimorphic; eyes usually pubescent. Male hypopygium moderate to large; female abdomen round apically (Clunionini) 2
   Hind tarsus with segment 2 longer than 3; all tarsi with segment 4 cordiform, 5 simple or deeply trilobate at tip; antennae seven-segmented in both sexes; eyes bare. Male hypopygium small; female abdomen tapered (Telmatogetonini) 3
2. Tarsal segment 2 of hind leg much shorter than 3, segment 5 slightly bilobate; wing of male fully developed, absent in female; antennae of male usually 10-segmented, of female reduced to four to seven segments .... **Clunio**
   Tarsal segment 2 of hind leg subequal to 3, segment 5 simple; wing straplike or practically absent, similar in both sexes; antennae four- to seven-segmented .... **Eretmoptera,*** **Tethymyia,*** and **Belgica***
3. Tarsal segment 5 simple or slightly bilobate at tip .... **Thalassomyia**
   Tarsal segment 5 deeply trilobate at tip 4
4. Both sexes fully winged; legs unmodified, hairs of legs weak .... **Telmatogeton**
   Both sexes brachypterous or fully winged; if winged, fore legs of male modified; femora swollen with angular projection near apex which interlocks with basal projection of tibia; hairs of legs strong, sometimes flattened and scalelike .... **Psammathiomyia,*** **Halirytus,*** and **Paraclunio***

* Not recorded from Micronesia.

Genus **Clunio** Haliday

Clunio Haliday, 1855, Nat. Hist. Rev. 2: 62.—Chevrel, 1894, Arch. Zool. Exp. **28**: 583; 1913, *Ibid.* **51**: 501.—Kieffer, 1906, Genera Insectorum **42**: 4.—Goetghebuer, 1914, Ann. Biol. Lacustre **7**: 165.—Thienemann, 1915, Archiv Hydrobiol., Suppl. **2**: 468.—Edwards, 1926, Zool. Soc. London, Proc. **51**: 785; 1929, Roy. Ent. Soc. London, Trans. **77**: 370; 1931, Dipt.

Patagonia South Chile 2 (5) : 304.—Tokunaga, 1933, Philippine Jour. Sci. **51** : 88; 1937, Fauna Nipponica **10** (7) : 16; 1938, Annot. Zool. Japon. **17** : 125.—Williams, 1944, Hawaiian Ent. Soc., Proc. **12** : 170.—Stone and Wirth, 1947, Ent. Soc. Washington, Proc. **49** : 202.—Wirth, 1949, Univ. Calif. Pub. Ent. **8** : 158.—Freeman, 1955, British Mus. (N.H.) Ent. Bull. **4** : 65.

Eyes pubescent; mouthparts reduced; male with well-developed wings, microtrichia absent; female lacking wings and halters; legs stout, pulvilli absent, empodium as large as claws; male hypopygium large, at least half of total length of abdomen, styles subtriangular.

Marine in habitat.

Key to Micronesian Species of Clunio

Antenna of male with last segment at least as long as preceding seven segments together, intermediate flagellar segments mainly discoidal, shorter than wide .... **35. pacificus**

Antenna of male with last segment at most as long as preceding four segments together, intermediate flagellar segments mainly as long as or slightly longer than wide .... **36. tuthilli**

25. Clunio pacificus Edwards.

Clunio pacificus Edwards, 1926, Zool. Soc. London, Proc. **51** : 779; 1928, Insects of Samoa **6** (2) : 61.—Oka, 1926, Zool. Anzeiger **68** : 205; 1930, Zool. Jahrb. Abt. Syst. **59** : 253.—Tokunaga, 1935, Mushi **8** : 14; 1937, Fauna Nipponica **10** (7) : 18; 1938, Annot. Zool. Japon. **17** : 126. —Stone and Wirth, 1947, Ent. Soc. Washington, Proc. **49** : 219.

Male: Antenna 11-segmented; last segment shorter than rest of flagellum, but longer than preceding seven segments. Eyes without interfacetal hairs. Cu_2 distinctly but not abruptly curved. All tibiae with apical spurs; hind tibial spur slightly curved at tip.

S. MARIANA IS. ROTA: Male, June 1946, Townes.

PALAU. BABELTHUAP: Male, Ngaiangl, light trap, Dec. 1952, Gressitt.

DISTRIBUTION: Japan, Ryukyu Is., S. Mariana Is., Caroline Is., Samoa.

The specific characters of this marine midge have been studied thoroughly by Stone and Wirth (1947), and there is nothing additional to add.

36. Clunio tuthilli Tokunaga, n. sp. (fig. 8).

Minute yellowish-white and yellowish-brown species. Eyes with distinct pubescence; antenna 10-segmented, with last segment slightly longer than preceding three together, but shorter than four together, segment 2 about 0.75 times as long as last segment; legs with apical tibial spurs strongly curved at apices; wings with Rs about 2.6 times as long as R_1 and slightly shorter than M, Cu_1 almost straight and fMCu just before level of tip of R_1.

Male: Body about 1.76 mm. long; wings about 1.26 by 0.67 mm. General coloration yellowish brown and white. Head yellowish brown, with eyes distinctly pubescent and widely separated above by one-third width of head, proboscis almost atrophied, clypeus without setae; palp fingerlike, non-segmented, with seven setae and slightly longer than twice width (13: 5.5); antenna (fig. 8, *a*) 10-segmented, mainly yellowish brown, but 2 white on basal three-fourths, relative lengths of these segments about 21: 33.8: 10: 10.5: 11.5: 12.5: 12: 12.3: 10.3: 45.5, segment 2 about 2.4 times as long as wide (33.8: 15), last segment about four times as long as wide (45.5: 12).

Thorax yellowish brown, with setae very sparse and arising from white basal spots, acrostichal setae absent, seven dorsal central setae arranged in line on preapical half of scutal fovea, four supraalar setae; scutellum with about 11 setae. Legs mainly

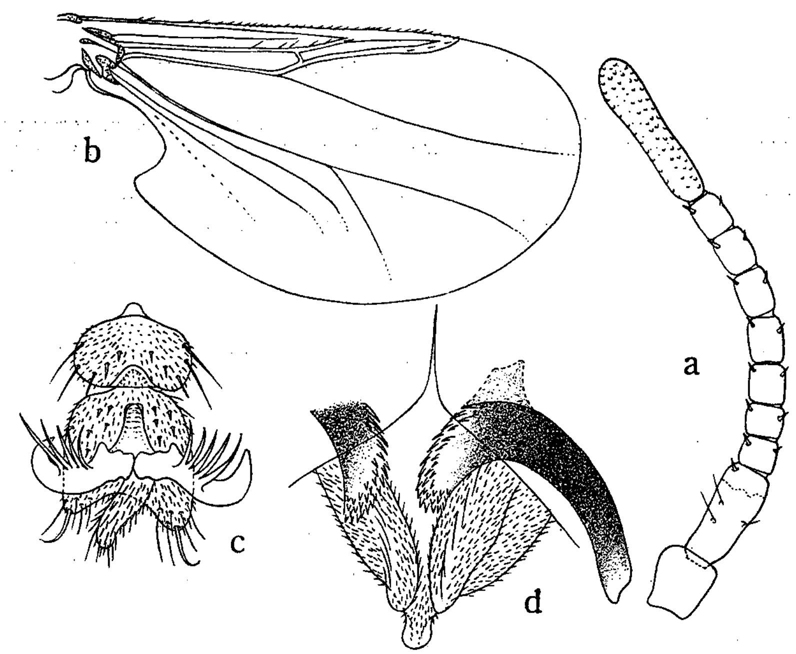


FIGURE 8.—*Clunio tuthilli,* male: **a,** antenna; **b,** wing; **c,** last two tarsal segments of fore leg; **d,** aedeagus and paramere, sternal aspect.

white, but coxae, trochanters, bases of tibiae, all articulations, apical three tarsal segments of fore and mid legs and tarsal segments 2, 4, and 5 of hind legs yellowish brown; tibial spurs present on all legs and strongly curved at tips; claws of all legs (fig. 8, *c*) similar, equal, strongly curved, each with palmate hyaline lobe on sub-basal part, empodia stout and slightly shorter than claws. RL-L about 117: 182: 34: 14: 11.5: 8.5: 20 in fore leg, 154: 147: 23: 14: 12: 9: 20 in mid leg, and 162: 151: 28: 14: 22: 9: 22 in hind leg. Wing (fig. 8, *b*) white, with veins yellowish pale brown, R with few setae on apical one-third, R_1 with three setae and Rs also with three on apical one-third; venation: costa ending at apical one-fifth of wing length (75: 97), Rs about 2.6 times R_1 (29: 11), R, M and stem of fMCu in proportion of 33: 32: 44, r-m about equal to

basal section of Rs, fMCu just before level of tip of R_1 and its angle about 40 degrees, M_{3+4} and Cu_1 almost straight, atrophied before wing margin. Halter yellowish white.

Abdomen with tergites yellowish brown, pleural and sternal sides white. Hypopygium yellowish brown; coxites fused basally with each other, apical one-third divergent with angle of about 90 degrees; style subtriangular, about 0.4 as long as coxites (56: 140), 1.6 times as long as wide (56: 35), with five to six minute recurved hooks at tip, three similar hooks at basal angle; aedeagus (fig. 8, *d*) entirely pubescent; parameres strongly sclerotized, mainly dark, arcuate and with minute spinules on mesal apical parts.

Holotype, male (US 66548), Jobtan I., Eniwetok Atoll, Marshall Is., at light, Sept. 1, 1956, Tuthill. Paratypes (BISHOP, US), nine males, Medren I., Eniwetok Atoll, Sept. 3, 1956, Tuthill.

DISTRIBUTION: Marshall Is. (Eniwetok).

This species is allied to *C. marshalli* Wirth from Biscayne Channel, Florida, but in that species, the last antennal segment is fully as long as the preceding four segments together, the scutellum and scutum are far less setigerous (the former with four or six setae, the latter with two to four acrostichal and two to three supraalar setae), vein Cu_1 is distinctly curved, and the hypopygium bears strongly curved parameres.

Genus **Thalassomyia** Schiner

Thalassomyia Schiner, 1856, Zool.-Bot. Ver. Wien, Verhandl. **6**: 218.—Edwards, 1924, Ent. Mo. Mag. **60**: 204; 1926, Zool. Soc. London, Proc. **51**: 786; 1929, Roy. Ent. Soc. London, Trans. **77**: 371.—Wirth, 1946, Hawaiian Ent. Soc., Proc. **13**: 117; 1949, Univ. Calif. Pub. Ent. **8**: 166.—Freeman, 1955, British Mus. (N.H.) Ent. Bull. **4**: 65.

Scopelodromus Chevrel, 1903, Archiv Zool. Exp. **1**: 1.

Galapagomyia Johnson, 1924, Zoologica **5**: 86.

Campontia Johnston, 1830, Zool. Jour. **3**: 325 (as annelid worm).

Eyes bare, palp not reduced, antennae of both sexes similar, seven-segmented. Wings fully developed in both sexes, with microtrichia, R_{4+5} curved, long, extending far beyond tip of M_{3+4}, squama almost completely fringed. Legs elongate, with tarsal segment 3 bilobate at tip, 4 short and strongly cordiform, last simple and not trilobate at tip, empodium very large. Male hypopygium small, turned through 180 degrees, styles infolded; female cerci prominent and elongate caudad.

Species of *Thalassomyia* are marine in habitat.

Key to Micronesian Species of Thalassomyia

Setae of legs suberect and slender; wing with fMCu only slightly beyond level of r-m; male hypopygium with styles sharply pointed; female with 7 to 16 long, slender setae on ninth hemisternite of abdomen..........................**37. maritima**

Setae of legs decumbent and stout; wing with fMCu distinctly beyond r-m; male hypopygium with styles round at tip; female with 7 to 10 stout setae on ninth hemisternite of abdomen..........................**38. sabroskyi**

37. Thalassomyia maritima Wirth (fig. 9, *a-g*).

Thalassomyia maritima Wirth, 1947, Hawaiian Ent. Soc., Proc. **13**: 131; 1949, Univ. Calif. Pub. Ent. **18**: 169.

Thalassomyia pilipes Edwards, 1935, Insects of Samoa **9** (3): 110.

All the specimens from Micronesia agree well with Wirth's original description except in the shape of the second antennal segment (fig. 9, *a, b*). In the Micronesian specimens, this segment is always more or less constricted at the middle and relatively longer, relative lengths of distal six segments being 28.2: 15: 14.2: 12.5: 12.4: 34.5 in male (mean of 11 antennae) and 28.3: 14.3: 13: 12.5: 12.3: 32 in female (mean of four antennae). The dorsal lobes of the coxites of the male hypopygium (although said to be conical by Wirth, 1947) vary from conical to thumb-shaped (fig. 9, *c-e*). The styles also vary in development of swelling of flexor side (fig. 9, *f, g*). The present species and *japonica* Tokunaga and Komyo are closely related in structures of antennae (in *japonica*, male with RL-A 22.8: 32.4: 15.9: 14.8: 13.4: 13.6: 39.7 and female with 25: 31.8: 15.3: 13.8: 12.8: 12.3: 31.3) and the hypopygia of both sexes. The most distinctive difference is shown in the number of setae as follows:

Position of setae	T. maritima Male	T. japonica Male
Frons	35 (30-41)	66.5 (60-72)
Clypeus	26.6 (22-28)	58.8 (54-67)
Pronotal lobe	8.6 (7-11)	9.2 (8-11)
Acrostichal	19.8 (15-24)	36.3 (28-45)
Dorsocentral	16.2 (11-19)	22.5 (21-26)
Supraalar	6.3 (5- 8)	7.3 (6- 9)
Scutellum	16.3 (10-19)	33 (30-40)
	Female	Female
Frons	41.5 (37-46)	47.5 (47-48)
Clypeus	28.7 (24-32)	52.5 (45-60)
Pronotal lobe	8.8 (8-10)	12.3 (11-13)
Acrostichal	19.7 (18-23)	33.5 (30-37)
Dorsocentral	15.3 (13-18)	18.3 (14-22)
Supraalar	7.6 (5- 8)	6.3 (5- 7)
Scutellum	17.7 (12-21)	22.5 (19-26)
Ninth hemisternite	11.6 (7-16)	13 (11-16)

DISTRIBUTION: New Caledonia, China (Hong Kong), S. Mariana Is., Caroline Is., Marshall Is.

S. MARIANA IS. TINIAN: Ten females, five males, Tinian harbor, sweeping grass by tide pool, Mar. 1945, Dybas. GUAM: Five males, Pt. Ritidian, light trap, June 1945, Gressitt, two males, Feb. 1938, Oakley.

PALAU. BABELTHUAP: One female, Ulimang, Dec. 1947, Dybas. KOROR: One female, Koror I., light trap, Apr. 1957, Sabrosky. NGERKABESANG: Female, male, at seashore, Nov. 1947, Dybas.

MARSHALL IS. MAJURO: Female, July 1950, La Rivers. ENIWETOK: Male, Engebi I., at light, Dec. 1950, Oshiro; three males, Jobtan I., Aug. 1956, Tuthill. KWAJALEIN: Six females, five males, Keck.

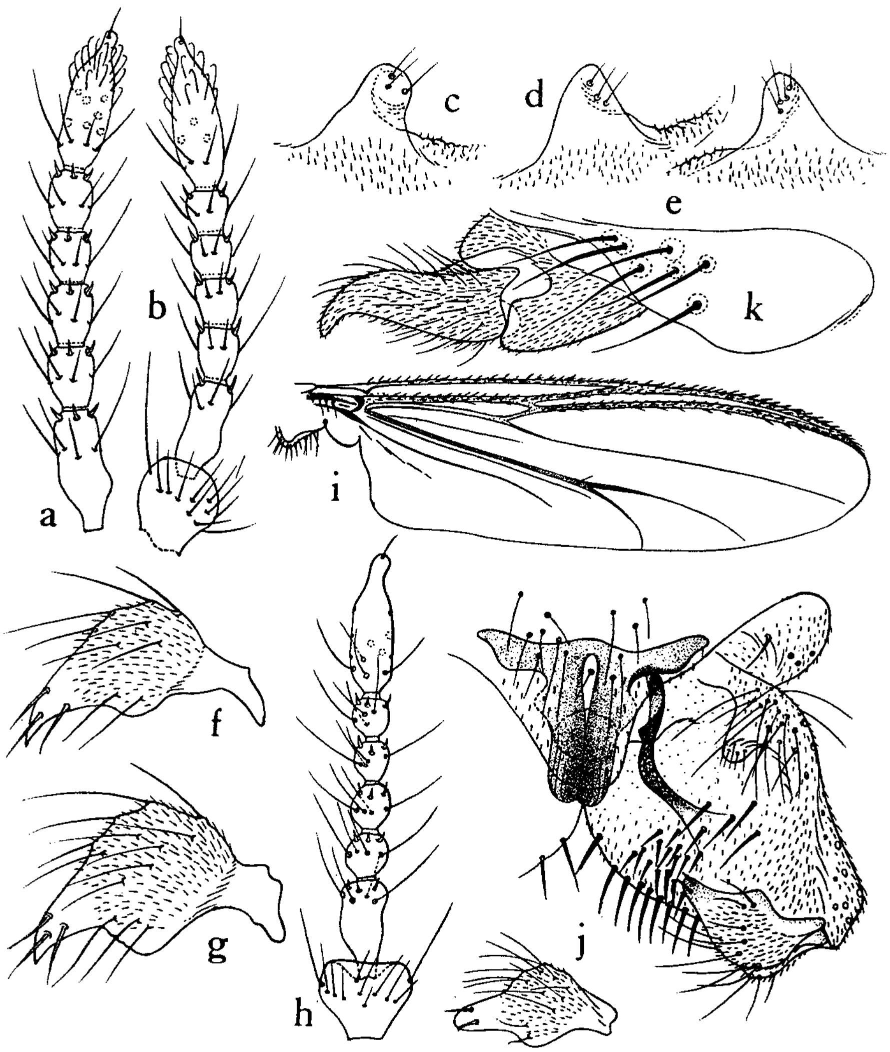


FIGURE 9.—*Thalassomyia* spp. **a-g,** *T. maritima: a,* male antenna (scape omitted); *b,* female antenna; *c-e,* various shapes of lobes of coxites of male hypopygia; *f, g,* style of male hypopygia. **h-k,** *T. sabroskyi: h,* male antenna; *i,* male wing; *j,* male hypopygium and style; *k,* female cercus and its basal sclerites.

38. Thalassomyia sabroskyi Tokunaga, n. sp. (fig. 9, *h-k*).

Medium-sized, yellowish-brown species. Antenna with segment 2 somewhat constricted preapically, last segment tapering to terminal nipple; scutellum with eight to nine setae; legs with setae short, stout, dark, decumbent with about a 30-degree angle, those of tibia at most twice as long as diameter of segment; wing with costa, M, R_1 and Rs setigerous, fMCu under middle of R_1 and at middle of wing length.

Male: Body about 2.93 mm. long; wings about 2.2 mm. by 0.66 mm. General color yellowish brown, but setae of wing veins, legs, and thorax mainly dark. Head with eyes bare and widely separated above; frons with about 29 setae, clypeus with 27 setae; palp four-segmented, longer than antenna, basal two segments very short, following two slender; antenna (fig. 9, *h*) seven-segmented, with setae dark, basal segment with about 10 setae, other segments each with four, but last with single apical besides four basal, segment 2 somewhat constricted on preapical part, last segment about as long as preceding three segments together, gradually tapered to terminal nipple; RL-A about 20.5: 27: 13.5: 14: 12.8: 13: 40.5.

Thorax yellowish brown; pronotal lobes each with 6 to 11 setae; scutum with humeral triangular parts, small triangular spot on caudoscutal area just before scutellum and supraalar lobes yellow; 15 to 21 acrostichal setae, 9 to 16 dorsocentral setae, five to seven supraalar setae; scutellum with nine setae at middle. Legs with setae dark, short, stout, decumbent with about a 30-degree angle, tibia with setae on extensor side long but at most twice as long as diameter of the segment (30-33: 16-18 at middle of hind tibia). Wing (fig. 9, *i*) pale yellowish brown, squama with marginal setae, costa, R, R_1, and Rs dark, fMCu without or with one to two setae. Venation: costa ending very near wing tip, relative lengths of R, M, and stem of fMCu about 54.5: 43.5: 79, Rs about three times R_1 (106: 38), r-m about three times basal section of Rs (15: 5), fMCu under midpoint of R_1, situated at middle of wing and with angle very small, M_{3+4} hardly twice Cu_1 (59: 30) and the latter strongly curved downward apically. Halter yellowish white.

Abdomen with setae small, brown and rather densely spread on tergites and sternites. Hypopygium (fig. 9, *j*): coxite with seven to eight strong, dark, simple, spinelike setae arranged in a line along mesal margin, about 15 to 20 similar or slightly more slender setae on middle part of tergal side, basal tergal lobe of coxite somewhat thumb-shaped, with tip not pubescent, shallowly concave and with five to eight very fine setae, lateral basal part with many delicate yellow setae near basal tergal lobe; style short, somewhat rhombic, round on extensor side, slightly produced towards flexor side, with tip not pubescent, bluntly pointed and with two short, preapical setae; internal thickening of coxite dark, curved, rather long and about half as long as coxite.

Female: Body about 3.29 mm. long; wings about 1.94 (1.7-2.17) mm. by 0.69 (0.62-0.75) mm. Coloration and structure similar to those of male with usual sexual differences. Frons with about 32 setae, clypeus with about 38 setae. RL-A 17.5: 25.3: 12.5: 12.8: 11.8: 11: 39.3. Pronotal lobe with five to seven setae; scutum with about 22 acrostichal, 10 to 15 dorsocentral, 5 to 7 supraalar setae; scutellum with 8 to 16 setae. Wing with vein Rs about three times R_1 (100: 35), R, M, and stem of fMCu about 30: 40: 75, r-m twice basal section of Rs (15: 7), M_{3+4} twice Cu_1 (58: 30). Abdomen (fig. 9, *k*) with hemisternites of last segment setigerous, bearing 7 to 10 dark setae arising from yellow spots; cerci about three times as long as basal width (45: 15), evenly and gradually tapered into downcurved tip, with many slender setae yellow and at most half as long as those of last sternite (15: 28).

Holotype, male (US 66549), Melekeiok, Babelthuap I., Palau Is., at light, May 22, 1957, Sabrosky. Allotype, female (US), data same as for holotype. Paratypes, male, data same as for holotype; female, Kolonia, Yap I., light trap, June 21, 1954, Sabrosky.

DISTRIBUTION: Caroline Is. (Palau, Yap).

This species is intermediate between *T. africana* Edwards and *T. maritima* Wirth. *T. africana* distinctly differs from the present species in the following: last antennal segments nearly three times as long as wide, instead of fully three times as in the new species (3.2-3.5 times in male and 3.3 times in female), Rs about twice R_1, stem of fMCu as long as M_{3+4}, fMCu at level of origin of r-m, male hypopygium with styles not broadened toward flexor side, quite slender and long, basal tergal lobe of coxite thin, flat, setigerous and pubescent except bare extreme tip. *T. maritima* differs in the following points: legs with setae not decumbent, but suberect, yellowish brown, rather slender and those of middle part of hind tibia at most three times as long as diameter of the segment, fMCu only slightly beyond origin of r-m, style of male hypopygium sharply pointed, last abdominal sternite with 7 to 16 light-colored hairs. Another allied species may be *T. japonica* Tokunaga and Komyo, but in this allied species, fMCu of wing vein is located under the basal one-third of R_1 and the style of male hypopygium is sharply pointed at the tip.

Genus **Telmatogeton** Schiner

Telmatogeton Schiner, 1866, Zool.-Bot. Ges. Wien, Verhandl. **16**: 931; 1868, Nov. Reise Novara, Zool. **2**: 25.—Edwards, 1928, Konowia **7**: 234.—Tokunaga, 1937, Fauna Nipponica **10** (7): 21.—Wirth, 1947, Hawaiian Ent. Soc., Proc. **13**: 145; 1949, Univ. Calif. Pub. Ent. **8**: 170.—Freeman, 1955, British Mus. (N.H.) Ent. Bull. **4**: 66.

Charadromyia Terry, 1913, Hawaiian Ent. Soc., Proc. **2**: 292.

Trissoclunio Kieffer, 1920, South African Mus., Ann. **17**: 523.

Palp reduced to two segments, antennae of both sexes similar and seven-segmented, wings fully developed in both sexes and with microtrichia, R_{4+5} curved, long and almost reaching wing tip, squama fringed. Legs elongate, with last tarsal segments trilobate, setae of legs uniform and short, fore femur of male simple, empodium large. Male hypopygium small, rotated through 180 degrees, styles infolded; female with cerci prominent, elongate caudad forming conical ovipositor.

Marine in habitat except for certain Hawaiian species.

39. **Telmatogeton pusillum** Edwards.

Telmatogeton pusillum Edwards, 1935, B. P. Bishop Mus., Bull. **114**: 88.—Wirth, 1947, Hawaiian Ent. Soc., Proc. **13**: 181.

Small species, wing 2 mm. Last tarsal segment with median terminal projection fingerlike, not broadened toward tip, lateral projections in male very short, in female slightly longer, but still less than half as long as median projection; empodium simple, not bifid. Wing with Cu_2 rather suddenly bent beyond middle, its distal part reflexed and almost straight.

DISTRIBUTION: Marquesas Is., S. Mariana Is.

S. MARIANA IS. SAIPAN: Female, two males, Chalan Kanoa, at light, Jan. 1949, Maehler.

Subfamily CHIRONOMINAE

Synonyms: Tendipedinae and Chironomariae.

Eyes usually with dorsal narrow portion; male antennae plumose and 11- to 14-segmented, female antennae 5- to 7-segmented. Pronotum sometimes collarlike, but often reduced and not visible from above, postscutellum with distinct keel or furrow. First tarsal segment of fore leg nearly always longer than tibia, or at least as long (LR more than 1), fore tibia with apical scalelike projection which may be either round, subtriangular, pointed, slender, or bearing bristlelike spur on apex; mid and hind tibiae normally with two apical combs composed of basally fused spinules, tibial spurs associated with these combs, but sometimes one or both spurs reduced or absent, comb separated or fused in various degrees, very rarely combs and spurs reduced. Wing with R_{2+3} simple, basal section of M_{3+4} absent, costa almost always ending abruptly at apex of R_{4+5}. Male hypopygium not inverted, except in *Pontomyia*, styles directed rigidly backward and without terminal spine, coxites usually with two or more basal appendages.

Key to Tribes of Chironominae

Wing membrane without macrotrichia, or if present, then squama with marginal fringe of long hairs; cross vein r-m definitely oblique in direction of vein R_{4+5} .... **Chironomini**

Wing membrane with macrotrichia at least toward apical part, or if absent then squama always without marginal fringe of setae; cross vein r-m nearly parallel to and practically continuous with R_{4+5} .... **Tanytarsini**

Tribe CHIRONOMINI

Synonym: Tendipedini.

Key to Genera of Chironomini

1. Mid and hind tibiae without combs or spurs .... **Lenziella,* Nepalia,*** and **Himatendipes***
   Mid and hind tibiae with both combs and spurs, but sometimes spurs reduced and paired combs fused with each other to varying degrees or combs composed of basally fused or free spinules 2

2(1). Tibial combs absent or composed of free or only basally fused (distal half or more free) spinules .... **Graceus,* Holtedahlia,* Dolichopelma,*** and **Corynocera***
   Tibial combs present and composed of basally fused spinules 3

3(2). Fore tibia with comblike structure (each spinule separated) or all tibiae with combs leaflike and long-spurred .... **Fleuria*** and **Pseudochironomus***
   Fore tibia without such comblike or leaflike apical armature 4

4(3). Squama of wing and fore tibial scale of leg absent .... **Prochironomus***
   Squama of wing and fore tibial scale of leg present 5

5(4). Hind tibia with two spurs (each comb with single spur) 6
   Hind tibia either with single spur or with neither comb spurred 13

* Not recorded from Micronesia.

6(5). Pulvilli large, broad, and distinct........ 7
Pulvilli absent or indistinguishable........ 11
7(6). Wing with macrotrichia on membrane........ **Phaenopsectra**
Wing without macrotrichia on membrane........ 8
8(7). Prothorax reaching to front of scutum, visible from above, often collar-like, sometimes divided by median dorsal suture but with both halves touching at mid-dorsal line........ **Chironomus**
Prothorax more reduced, not visible from above........ 9
9(8). Mid tibia with four spurs on outer combs or palp only three-segmented and body with tufts of long hairs........ **Henrardia*** and **Collartiella***
Mid tibia with single spur on each comb or one comb not spurred, palp five-segmented as usual and body without tufts of long hairs........ 10
10(9). Scutum not produced forward........ **Glyptotendipes***
Scutum produced forward over head........ **Stenochironomus**
11(6). Fore tibial scale with apical spur or spine........ **Nilothaume,*** **Nilodosis,*** and **Paratendipes***
Fore tibial scale without apical spur or spine........ 12
12(11). Squama of wing bare........ **Paratendipes***
Squama of wing fringed, palp very short, with segments almost round........ **Chironomus (Halliella*)**
13(5). Prothorax reaching front of scutum, visible in dorsal aspect, although it may be narrow and with mid-dorsal suture; pulvilli large and distinct........ 14
Prothorax more reduced, not visible in dorsal aspect........ 15
14(12). Fore tibial scale with long, slender apical spine........ **Omisus***
Fore tibial scale without apical spine (small apical spine on some species of subgenus *Endochironomus*)........ **Chironomus**
15(13). Fore tibia longer than following first tarsal segment (LR less than 1)........ **Allochironomus***
Fore tibia shorter than first tarsal segment (LR larger than 1)........ 16
16(15). Fore tibia without scale or spine........ **Apedilum***
Fore tibia with scale or spine........ 17
17(16). Scutum projecting forward as a cone above head, prothorax much reduced, acrostichal bristles well developed and in double line reaching back to center of thorax........ 9
Scutum either not like above or else acrostichal bristles present only at apex of cone........ 18
18(17). Squama of wing bare; femora often swollen apically to form a slight club........ **Kloosia,*** **Lauterborniella,*** and **Kribiodosis***
Squama of wing fringed; femora only swollen apically in *Lepidopodus*........ 19
19(18). With membrane with macrotrichia, at least at apex........ **Polypedilum (Pentapedilum)**
Wing membrane without macrotrichia and quite bare........ 20
20(19). Legs clothed with adpressed scales as well as erect bristles........ **Lepidopodus***
Legs without scales........ 21
21(20). Pulvilli present, though small........ 22
Pulvilli absent or vestigial and indistinguishable........ **Kribioxenus*** and **Kribiothauma***
22(21). Pulvilli large and split longitudinally; male abdominal segment 8 strongly constricted at base........ **Polypedilum** (str.)
Pulvilli small and not split longitudinally; male abdominal segment 8 not strongly constricted at base........ 23
23(22). Combs of mid and hind tibiae separated from each other........ **Microtendipes***
Combs of mid and hind tibiae fused with each other........ **Stictochironomus**

Genus **Chironomus** Meigen

Tendipes Meigen, 1800, Nouv. Classif. Mouches, 17.—Goetghebuer, IN Lindner, 1937, Flieg. Palaearkt. Reg. **13**, c: 18.—Townes, 1945, Am. Midland Naturalist **34**: 101.

Chironomus Meigen, 1803, IN Illiger's Mag. **2**: 260.—Goetghebuer, 1928, Faune France **18**: 46.—Freeman, 1957, British Mus. (N.H.) Ent. Bull. **5**: 329.

Halliella Kieffer, 1911, Indian Mus., Rec. **6**: 172.

Dicrotendipes Kieffer, 1913, Voy. Alluaud et Jeannel Afr. Orient, Ins. Dipt. **1**: 23.

Cryptochironomus Kieffer, 1918, Ent. Mitt. **7**: 46.—Townes, 1945, Am. Midland Naturalist **34**: 96.

Limnochironomus Kieffer, 1920, Soc. Sci. Bruxelles, Ann. **39**: 166.

Xenochironomus Kieffer, 1921, Soc. Hist. Nat. Moselle, Bull. **29**: 69.—Townes, 1945, Am. Midland Naturalist **34**: 91.

Chironomus subgenera *Chironomus* (sens. str.) and *Endochironomus*, Edwards, 1929, Ent. Soc. London, Trans. **77**: 380, 393.

Male antennae 12-segmented (14-segmented only in some species of subgenus *Endochironomus*) and female usually six-segmented; frontal tubercles frequently present; palp usually long, but reduced in subgenera *Halliella* and *Nilodorum* and occasionally elsewhere. Prothorax reaching to front of scutum where it may form a collar with or without emargination at center, often with centrally dividing suture, but halves of pronotum close together and not widely separated. Fore tibial scale without apical spine (except in a few species of *Endochironomus* with minute, needlelike spine), combs of mid and hind tibia large and each with single short spur; spur sometimes reduced or even absent; pulvilli large and broad. Wing membrane without macrotrichia; squama with complete fringe, crossvein r-m distinct and oblique, fMCu under or slightly beyond r-m, R_{2+3} ending only slightly beyond tip of R_1. Abdomen without mid-dorsal impressions.

Key to Subgenera of Chironomus

1. Prothorax collarlike and with well-marked V-shaped emargination on mid dorsal part; thorax usually pruinose; frontal tubercles usually present and elongate; male hypopygium with both dorsal and ventral appendages, ventral appendages broad, straight and with many long curved bristles on apical part........**Chironomus** (sens. str.)
   Prothorax usually narrower and applied to front of scutum with centrally dividing suture, occasionally collarlike, but then at most with a shallow dorsocentral emargination; thorax with pruinose lines along bases of scutal bristles; frontal tubercles usually absent or small; male hypopygium with ventral appendages often racket-shaped, narrower basally or reduced........2

2(1). Palp very short, segments not more than two or three times as long as broad; thorax thickly covered with gray dust; male appendages all well developed........**Halliella*** and **Nilodorum***

* Not recorded from Micronesia.

Palp only rarely short, segments usually about six times as long as wide; thorax with thin gray dust only in a few species 3

3(2). Both appendages of male hypopygium well developed; fore leg with last tarsal segment normal and cylindrical 4

Either dorsal or ventral appendage or both reduced and rudimentary; fore leg with last tarsal segment flattened 5

4(3). Male hypopygium with ventral appendage narrower basally and curved or bowed upward; male antenna always 12-segmented, female six-segmented; fore tibial scale never spurred .... **Dicrotendipes***

Male hypopygium with ventral appendage of more even width, not curved upward or bowed; male antenna sometimes 14-segmented, female either six- or seven-segmented; fore tibial scale sometimes spurred at tip .... **Endochironomus**

5(3). Ventral appendage of male hypopygium well formed, reaching beyond end of coxite and with curved bristles on apical part .... **Xenochironomus***

Ventral appendage of male hypopygium not reaching beyond end of coxite, without long curved hairs and often either rudimentary or absent .... **Cryptochironomus**

Subgenus **Chironomus** Meigen

Tendipes Meigen, 1800, Nouv. Classif. Mouches, 17.—Goetghebuer, IN Lindner, 1937, Flieg. Palaearkt. Reg. **13**, c: 21.—Townes, 1945, Am. Midland Naturalist **34**: 116.

Chironomus Meigen, 1803, Illiger's Mag. **2**: 260.—Kieffer, 1908, Denkschr. Med. Nat. Ges. Jena **13**: 158; 1911, Linn. Soc. London, Zool. Trans. **14**: 351 (in part); 1913, Voy. Alluaud et Jeannel Afr. Orient Ins. Dipt. **1**: 14; 1914, South Afr. Mus., Ann. **10**: 263; 1918, Mus. Nat. Hungarici, Ann. **16**: 66 (in part); 1923, Soc. Sci. Bruxelles, Ann. **42**: 382; 1924, Ibid. **43**: 260.—Goetghebuer, 1928, Faune France. **18**: 46 (in part); 1934, Rev. Zool. Bot. Afr. **25**: 197.—Freeman, 1957, British Mus. (N.H.), Ent. Bull. **5**: 330.

Camptochironomus Kieffer, 1918, Ent. Mitt. **7**: 45.

Carteria Kieffer, 1921, Philippine Jour. Sci. **18**: 590.

Clinochironomus Kieffer, 1921, Soc. Sci. Bruxelles, Ann. **40**: 272.

Kiefferulus Goetghebuer, 1922, Ann. Biol. Lacust. **11**: 40.

Calochironomus Kieffer, 1922, Soc. Ent. France, Ann. **91**: 66; 1923, Soc. Sci. Bruxelles, Ann. **42**: 383; 1925, Soc. Roy. Ent. Egypt, Bull. **1924**: 290.

Einfeldia Kieffer, 1924, Soc. Sci. Bruxelles, Ann. **43**: 393.

Syntendipes Lenz, 1937, Archiv Hydrobiol., Suppl. **15**: 6.

Stictotendipes Lenz, 1937, Ibid. **15**: 8.

Chironomus subgen. *Chironomus* Group B, Edwards, 1929, Ent. Soc. London, Trans. **77**: 382.

Chironomus subgen. *Calochironomus* and *Chironomus,* Goetghebuer, 1936, Rev. Zool. Bot. Afr. **28**: 467, 470.—Freeman, 1954, Roy. Ent. Soc. London, Proc. B, **23**: 17, 18.

Tendipes subgen. *Kiefferulus, Einfeldia* and *Chaetolabis* Townes, 1945, Am. Midland Naturalist **34**: 110, 111 and 114.

Frontal tubercles usually present and elongate, palp long; pronotum collarlike and with central V-shaped emargination; scutum not produced forward over head or not forming cone, often with pruinose lines; male hypopygium with both dorsal and ventral appendages well developed, dorsal appendage with bare apical projection arising from basal pubescent pad, ventral appendage broad, stout and usually with long curved bristles on apical part, anal point always present, style usually slender but often thickened; in Micronesian species hind tibial combs always with two spurs.

KEY TO MICRONESIAN SPECIES OF SUBGENUS CHIRONOMUS

MALES

1. Wing with fuscus markings, at least in cell R_5 .... **40. pallidinubeculosus**
   Wing without markings or at most, with one small cloud or spot covering cross vein r-m 2
2(1). Hypopygium with styles stout, oval, not tapered 3
   Hypopygium with styles elongate, tapered apically 5
3(2). Hypopygium with dorsal appendage almost straight and not setigerous on basal pad, style with one small tooth at apex, ventral appendage slender, tapered .... **41. longilobus**
   Hypopygium with dorsal appendage curved on apical part and setigerous on basal pad, style with many spinules or setulae on mesal side of apical part, ventral appendage very or moderately broad 4
4(3). Basal pad of dorsal appendage forming triangular projection .... **42. crassiforceps**
   Basal pad of dorsal appendage not forming independent lobe .... **43. crassicaudus**
5(2). Scutal vittae partly brown or dark and partly yellow 6
   Scutal vittae entirely yellow (probably orange to yellow in life) 8
6(5). Dark parts of scutal vittae forming four spots on anterior part of scutum .... **44. bicoloris**
   Dark parts of scutal vittae forming four or six stripes along lateral sides of vittae 7
7(6). AR larger than 3.0 .... **45. plumatisetigerus**
   AR smaller than 2.0 .... **46. trifasciatus**
8(5). Fore leg with femur and tibia partly brown or dark, at least on knee part 9
   Fore leg with femur and tibia entirely yellow 11
9(8). Fore leg with tarsal segments entirely yellow, all femora with single small brown preapical ring .... **47. praeapicalis**
   Fore leg with tarsal segments entirely brown or dark, all femora apically dark or brown 10
10(9). Abdomen with tergal fuscus bands; AR about 2.66 (2.5-2.85) .... **48. claggi**
   Abdomen uniformly yellow or paler (probably green in life); AR about 2.1 (2.05-2.15) .... **49. carolinense**
11(8). Legs entirely yellow or pale, without tarsal dark bands; AR about 2.04 (1.9-2.22) .... **50. nigerilateralis**
   Legs with tarsal dark bands; AR larger than 2.5 12
12(11). Tarsal dark bands consisting of dark bases and apices; AR about 3.06 (2.9-3.14) .... **51. javanus**
   Tarsal dark bands consisting of only dark apices; AR 2.89 (2.7-3.09) .... **52. samoensis**

FEMALES

1. Wing with fuscus clouds, especially in cell R_5 .... **40. pallidinubeculosus**
Wing without clouds, except for single small cloud or spot covering cross vein r-m 2

2(1). Scutum with six distinct dark spots on yellow vittae .... **53. sexipunctatus**
Scutum without dark spots or with four or two spots on vittae 3

3(2). Scutal vittae entirely brown or dark 4
Scutal vittae not entirely brown or dark, but partly yellow or paler 6

4(3). All femora and tibiae entirely yellow .... **42. crassiforceps**
All femora and tibiae not entirely yellow 5

5(4). Abdominal segments uniformly pale .... **43. crassicaudus**
Abdominal segments with fuscus dorsal bands .... **48. claggi**

6(3). Scutum with median vittae dark brown and lateral ones paler or yellow .... **41. longilobus**
Scutum with vittae partly dark or brown and yellow or entirely pale to yellow 7

7(6). All femora with small dark preapical rings .... **47. preapicalis**
All femora entirely yellow or paler, or only knee parts dark or brown 8

8(7). Scutal vittae partly yellow or paler and partly brown or dark 9
Scutal vittae entirely yellow or paler 11

9(8). Scutal lateral vittae with anterior dark spots .... **44. bicoloris**
Scutal lateral vittae with fuscus lateral stripes 10

10(9). Abdominal tergites 2 to 4 with bands darker than those of following segments .... **46. trifasciatus**
Abdominal segments with obscure ill-defined fuscus clouds on all tergites .... **45. plumatisetigerus**

11(8). Tarsal segments dark at both ends .... **51. javanus**
Tarsal segments uniformly fuscus or dark only apically 12

12(11). Fore tibia dark or brown, at least on basal part 13
All femora and tibiae uniformly yellow or paler 15

13(12). Fore tibia dark or brown only at base .... **49. carolinense**
Fore tibia uniformly dark or brown 14

14(13). Frontal tubercles large and coniform; tarsal segments uniformly brown or black .... **55. sp. No. 2**
Frontal tubercles vestigial and papilliform; tarsal segments paler, slightly fuscus on distal segments .... **56. sp. No. 3**

15(12). Abdomen with lateral fuscus stripes, at least on basal segments .... **50. nigerilateralis**
Abdomen without lateral fuscus stripes 16

16(15). Legs with distinct black or brown bands on distal ends of tarsal segments .... **52. samoensis**
Legs without black or brown bands on tarsal segments 17

17(16). Wing vein R_{4+5} shorter than twice R_1 .... **54. sp. No. 1**
Wing vein R_{4+5} longer than twice R_1 .... **57. sp. No. 4**

40. Chironomus (Chironomus) pallidinubeculosus Tokunaga, n. sp. (fig. 10, *a, b*).

Rather large yellow species, wings with well-developed gray clouds and seams closely resembling African *calipterus* Kieffer; leg marking, value of LR, and structure of male hypopygium also similar to those of *calipterus*. Frontal tubercles large; AR 2.82-2.94, female antenna with last segment much shorter than preceding two together; scutum with yellow vittae on white ground color, lateral scutal vittae each with slender fuscus stripes on both sides, median scutal vittae each with similar fuscus stripe only on outer side in male and uniformly brownish in female. Legs with femora

each with narrow preapical pale brown ring, LR 1.78-1.94. Wing with anal lobe well developed, gray clouds and seams rather distinct.

Male: Body 4.2 mm. long; wings 2.07-2.35 mm. by 0.53-0.64 mm. Head pale brownish yellow, with mouthparts pale brown, eyes separated above by about one-fourth length of eye, frontal tubercles large, subcylindrical and as long as about two or two and one-half facets together; palp pale brown and five-segmented (13.3: 13.7: 41.7: 41.3: 64); AR 2.89 (2.82-2.94), scape yellowish brown, other segments and plumose hairs brown, last segments pointed at apex. Thorax mainly white, scutum with four yellow vittae, fuscus slender stripes on both sides of lateral vitta and only outside of median vitta, anterior part of scutum, just behind head, pale fuscus, postscutellum pale brownish yellow, pleural sclerites beneath wing base pale brownish, sternum yellow, scutellum with six bristles along caudal margin. Legs mainly yellow or yellowish white, coxa somewhat brownish, femur with narrow pale-brown ring on preapical part, tarsal segments with apical end brown, last one or two tarsal segments uniformly brown; pulvilli large, LR 1.85 (1.78-1.94), RL-FT 82.7: 64.3. Wing (fig. 10, *a*) with anal lobe well-developed, pale gray clouds and seams rather distinct but ill-defined, main veins white, but r-m and fR dark, fMCu under r-m, RL-V 70.7: 43.7: 79.3: 76.5. Halter white. Abdomen mainly pale brown or yellowish pale brown, tergites 1 to 6 slightly fuscus; hypopygium (fig. 10, *b*) with anal point slightly beyond tip of ventral appendage, oblong at apex and curved downward, style normal, dorsal appendage with basal area subtriangular, setigerous and pubescent, apical bare projection almost straight, slightly curved and not painted at tip, ventral appendage almost straight, with 10 to 11 curved apical bristles, some unequally bifid at tip.

Female: Body about 3.12 mm. long; wings about 2.13 mm. by 0.65 mm. Coloration somewhat more brownish than in male, but structures mainly as in male with usual sexual differences. Head brown, with mouthparts dark brown, eyes separated above by one-fifth length of eye; palp five-segmented (10: 10: 32: 40: 55); antenna fuscus pale brown, last segment dark, neck parts of intermediate flagellar segments little shorter than one-half of segments, six-segmented (17: 40: 29: 31: 29: 41). Thorax mainly pale yellow, median scutal vittae uniformly brown or pale brown, postscutellum brown, sternum pale brown, scutellum with six bristles along caudal margin and two small accessory setae on anterior part, RL-FT about 70: 55. Wings with anterior veins pale brown, RL-V about 63: 50: 85: 70. Abdomen, including cerci, uniformly pale brown.

Holotype, male (US 66550), Ulimang, Babelthuap I., Palau Is., Dec. 10, 1947, Dybas. Allotype, female (US), Koror, Koror I., Palau Is., at light, Apr. 29, 1957, Sabrosky. Paratypes, female, two males, same data as for holotype; male, Ngaremlengui, Babelthuap I., Palau, June 1, 1957, at light, Sabrosky.

Other specimens: Palau: Two females, Ulimang, Babelthuap I., Dec. 10-25, 1947, Dybas; two females, five males, Ngaremlengui, Babelthuap I., at light, June 1-3, 1957, Sabrosky; two males, Melekeiok, Babelthuap I., at light, May 22, 1957, Sabrosky; female, Ngardok Lake, Babelthuap I., at light, May 22, 1957, Sabrosky; male, Ngarmalk, 25 m., Palau, at light, Dec. 12, 1952, Gressitt; four females, two males, Koror, Koror I., July 24, 1956, McDaniel; four males, Koror, Koror I., Aug. 11 and Sept. 16, 1952 and Apr. 16, 1953, Beardsley.

DISTRIBUTION: Caroline Is. (Palau).

This species is closely allied to *calipterus* Kieffer (Africa), but is easily separated by the smaller value of AR, the different relative lengths of the female antennal segments, and the coloration of the scutum.

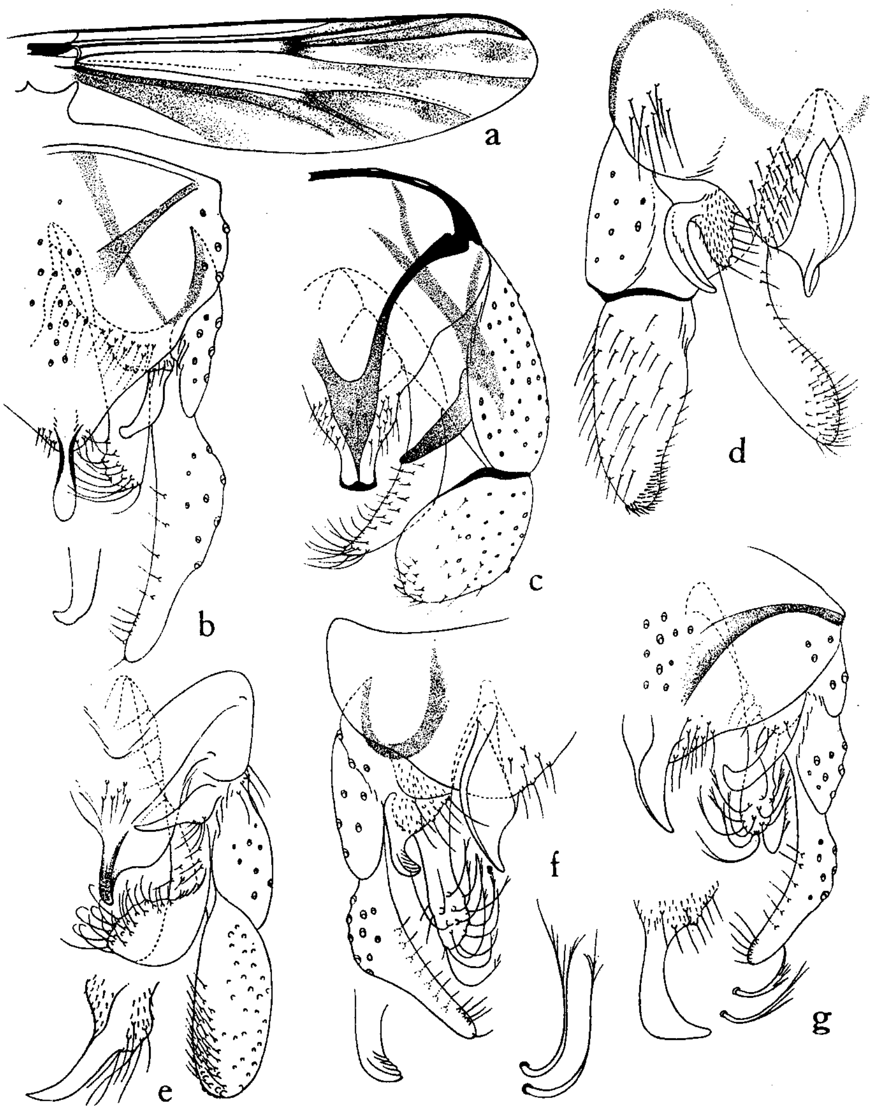


FIGURE 10.—*Chironomus* (s. str.), male wing and hypopygia: **a**, **b**, *C. pallidinubeculosus;* **c**, *C. longilobus;* **d**, *C. crassiforceps;* **e**, *C. crassicaudus;* **f**, *C. bicoloris;* **g**, *C. plumatisetigerus.*

41. Chironomus (Chironomus) longilobus Kieffer (figs. 10, *c*; 12, *b, c*).

Chironomus longilobus Kieffer, 1916, Mus. Nat. Hungarici, Ann. **14**: 107. —Tokunaga, 1940, Philippine Jour. Sci. **71**: 220.

Carteria longilobus Kieffer, 1921, Philippine Jour. Sci. **18**: 591.

Carteria longilobus var. *fulviventris* Kieffer, 1921, *Ibid.* **18**: 591.

In dry or alcoholic specimens, both sexes show four rather distinct brown or dark-brown scutal vittae on thorax, but these vittae largely due to the thoracic muscles; therefore, after treatment by clearing chemicals, male scutum shows four yellow vittae and the female two dark brown median and two yellow lateral vittae on hyaline and colorless ground.

Medium-sized yellowish pale-brown species; head with frontal tubercles minute; AR 1.73-1.97, female antenna six-segmented; LR 1.55-1.7, femora and tibiae mainly pale brownish yellow, knee parts dark or brown, fore tibia dark apically; thorax with four yellow scutal vittae in male, two dark brown median and two yellow lateral vittae in female; wing with fR and r-m not darker than other veins; abdomen almost uniformly pale except for posterior segments, without bands or spots.

Male: Body 3.64-4.75 mm. long; wings 2.16-2.51 mm. by 0.59-0.65 mm. Head with eyes separated above by one-fifth to one-sixth length of eye; palpal segments as 15: 14.2: 41.2: 51.6: 74.4; AR 1.82 (1.73-1.97). Thorax mainly pale yellow, scutal vittae yellow, scutellum with six (four to seven) bristles along caudal margin, without small accessory setae, postscutellum brownish. Legs mainly pale brownish yellow, knee parts brown, but in fore leg widely dark brown, tibiae more or less brownish at tip, but in fore leg distinctly dark, tarsi apically browned; LR about 1.55, RL-FT 88.2: 59.8. Wing with fR and r-m as pale as other veins, fMCu under origin of r-m, RL-V 72.3: 46: 87: 79. Halter yellowish white. Abdomen yellowish brown or paler, gradually more brownish caudad, no bands or spots; hypopygium highly specific, as in figure 10, *c*; anal point short, stout, truncate apically and setigerous at base, style short oval, with one minute apical claw and many small setae, dorsal appendage almost straight and strong, ventral appendage long, slender and slightly arcuate.

Female: Body 3.0-4.29 mm. long; wings 2.08-2.73 mm. by 0.62-0.77 mm. Very similar to male, but median scutal vittae of thorax dark brown and colored markings of legs more distinctive than in male. Head with eyes more widely separated above than in male; palpal segments about 15: 13: 45: 58: 77; antenna largely pale yellowish brown, but last segment more brownish, neck parts of intermediate flagellar segments short and about one-third of segments, six-segmented (22: 51: 31: 31: 30: 55). LR 1.65 (1.6-1.7), RL-FT 102.5: 72. Wing with fMCu under origin of r-m or just beyond it, RL-V about 84: 57: 101: 95.

Larva: Body length about 10 mm. when full-grown. Head mainly yellow; antenna five-segmented (32: 7: 1.5: 2.3: 2), basal segment about 3.5 times basal width, slightly tapered and with one trichoid sensilla as long as segment 2; mentum (fig. 12, *b*) with 15 black teeth, median tooth largest, second much smaller, third large and almost as large as median, fourth slightly smaller than second, fifth slightly larger than preceding one, following three gradually decreasing in size; mandible yellowish, with four rather slender, dark cutting teeth, apical one largest, one additional dorsoapical tooth yellowish brown and slightly shorter than apical cutting tooth, preapical brush-like structure with 10 setae arranged in line, and four basal plumose hairs; premandible (fig. 12, *c*) yellowish brown and with five slender teeth. Anterior pseudopods with numerous claws simple, very slender and very pale yellow; posterior pseudopods slender, each crowned with 16 simple, yellowish-brown claws; two pairs of very long bloodgills; caudal tuft with seven long and two minute yellow setae on very small tubercle; anal gills four, and rather small, dorsal pair about half as long as caudal tuft, subconical, slightly swollen laterad, pointed at apices and about 1.5 times as long as basal width, ventral pair smaller than dorsal, pointed, conical and triangular in lateral aspect.

DISTRIBUTION: Formosa, S. Mariana Is., Caroline Is.

S. MARIANA IS. SAIPAN: 14 females, Chalan Kanoa, Aug. 1944, Hall; five females, Chalan Kanoa, at light, Jan. 1949, Maehler; male, Pt. Afenia, June 1946, Townes; female, three males, Lake Susupe, in grass, Jan. 1949, Maehler; female, June 1951, Bohart. TINIAN: Two larvae, from tanks, Sept. 1945, Downs. AGIGUAN: Five males, at light, July 1952, Kondo. GUAM: Six females, five males, Pt. Oca, May to July 1945, Bohart and Gressitt; male, Pago, May 1945, Bohart and Gressitt; female, Nimitz Hill, May 1954, Clagg; male, Asan, Dec. 1952, Gressitt; female, at light, Oct. 1937, Oakley; male, 1911, Fullaway.

PALAU. BABELTHUAP: Male, Melekeiok, May 1957, Sabrosky; 22 females, six males, Ngiwal, May 1957, Sabrosky; 21 females, 50 males, Airai, Ngarsung, light trap along small stream, May 1957, Sabrosky; female, Ngardok Lake, light trap, May 1957, Sabrosky; 19 females, Ulimang, Dec. 1947, Dybas. KOROR: Female, four males, Nov.-Dec. 1947, Dybas; male, northeast corner, July 1946, Townes; female, July 1956, McDaniel; two females, at light, Apr. 1957, Sabrosky. ANGAUR: 14 females, male, Jan.-Feb. 1948, Dybas. PELELIU: 14 females, two males, at light, July-Aug. 1945, Dybas; two female, Ngasias, in clubhouse, Apr. 1936, Kondo; male, north corner, at light, Aug. 1945, Ducoff; female, male, east coast, Aug. 1945, Balaer; female, Aug. 1945, Hagen; 12 females, seven males, Mt. Amiangal, light trap, Dec. 1952, Gressitt; eight females, seven males, north, light trap, Dec. 1952, Gressitt; 15 females, north end, at light, May 1957, Sabrosky.

YAP. RUMUNG: Female, male, light trap, June 1957, Sabrosky. YAP: 17 females, two males, Dugor, Weloy, at light, June 1957, Sabrosky; 49 females, 16 males, Dugor, Weloy, at light, June 1957, Sabrosky; 21 females, 14 males, Kanif, Kolonia, North Tomil Distr., July-Aug. 1950, Goss; two females, Kolonia, at light, June 1957, Sabrosky; 53 females, 29 males, Hill behind Yaptown, light trap, Nov.-Dec. 1952, Gressitt; female, three males, Gachapar, Gagil Distr., light trap, June 1957, Sabrosky; female, Mt. Madaade, 95 m., light trap, Dec. 1952, Gressitt; two females, male, Giliman, at light, June 1957, Sabrosky; female, North Yap I., July-Aug. 1950, Goss; four females, Yap I., Oct. 1952, Krauss.

CAROLINE ATOLLS. SATAWAN: Female, Moch I., Nov. 1952, Beardsley. WOLEAI: Three females, Falalis I., Nov. 1952, Krauss; female, Feb. 1953, Beardsley. PULO ANNA: Nine females, two males, Sept. 1952, Krauss.

TRUK. TONOAS: 33 females, six males, Dec. 1935 to Jan. 1936, Ono. TOTIU: male, Jan. 1936, Ono.

This species is easily distinguished by the characteristic male hypopygium, the scutal color markings, and the fore leg bands.

42. Chironomus (Chironomus) crassiforceps Kieffer (fig. 10, *d*, 12, *d-h*).

Chironomus crassiforceps Kieffer, 1916, Nat. Hist. Hungarici, Ann. **14**: 111.—Tokunaga, 1939, Philippine Jour. Sci. **69**: 334.

Chironomus esakii Tokunaga, 1940, Ibid. **71**: 221.

Chironomus insolens Johannsen, 1946, B. P. Bishop Mus., Bull. **189**: 192.

Large yellow species, legs almost entirely yellow, with last two apical tarsal segments entirely and other basal tarsal segments only apically dark brown, but female with scutal vittae brown differing from yellow ones of male. Head with frontal tubercles well developed, AR 1.48-1.65, LR 1.46-1.7; fore leg of female with the two penultimate tarsal segments subequal in length; abdomen without fuscus or brown bands or spots; male hypopygium highly characteristic, bearing stout styles, two-ridged anal point, and C-shaped dorsal appendage.

Male: Body 3.5-5.2 mm. long; wings about 2.56 mm. by 0.68 mm. Head yellowish brown, mouthparts brown, eyes separated by one-fifth length of eye, frontal tubercles subcylindrical and as long as width of one to two facets; antenna brown, AR 1.55 (1.48-1.65). Thorax mainly yellow, scutum white, with four yellowish pale brown vittae, anterior margin just behind head fuscus, postscutellum pale brown on caudal half, pleural and sternal sclerites pale brownish yellow, scutellum with about 13 bristles and 7 small setae. Legs with coxae and trochanters yellowish pale brown, following segments mainly yellow, but all tarsal segments apically dark and last two segments entirely fuscus; LR 1.62 (1.46-1.7), RL-FT 102.3: 100. Wing with all veins very pale brown, fMCu just beyond origin of r-m, RL-V about 79: 55: 95: 85. Halter yellowish white. Abdomen mainly yellow, but pale brownish on caudal segments, no bands or spots; hypopygium (fig. 10, *d*) brown, anal point stout, with two distinct dorsal ridges, caudal projection small and oval, style very stout and with dense minute spinules on apical part of mesal side, dorsal appendage C-shaped, with triangular setigerous basal part produced beyond base of bare process, ventral appendage large, long, with many small bristles dense at apex and sparse at middle.

Female: Body 4.53 (3.41-5.4) mm. long; wings 2.46 (2.08-2.77) mm. by 0.78 (0.72-0.83) mm. Thorax with four brown scutal vittae and sternum and pleural sclerite beneath wing base brownish, differing distinctly from male. Palp five-segmented (14.6: 14.6: 47.2: 50.6: 71.2); antenna mainly yellow, last segment brown, neck parts of intermediate segments short and only one-third of segments, six-segmented (20.2: 39: 27.6: 28.6: 27: 50.4). Scutellum with 10 bristles and 7 to 11 small setae, postscutellum largely brown and only yellow on anterior margin. LR 1.6 (1.58-1.64), RL-FT 89.8: 73.8, RL-T 125: 63: 55: 54: 27. Wing with fR and r-m slightly more brownish than other veins, fMCu under or just beyond origin of r-m, RL-V 68.7: 62.7: 103.3: 78. Abdomen largely yellow or yellowish brown, only more brownish posteriorly.

Pupa: Body length about 5.9 (5-6) mm. Frontal tubercles (fig. 12, *g*) triangular, as long as basal width, brown and each with small apical seta. Thoracic respiratory organ white, large tuft of filaments. Abdominal tergite 2 with caudal ridge of 77 brown hooklets arranged in line, each hooklet with one or two minute teeth, lateral side of segment 2 with small caudal swelling bearing small seta; lateral side of segment 4 with spinulous patch on caudal part; tapelike swimming hairs developed on lateral ridges, four on either side of segments 5 to 7 and usually five (rarely three or four) on segment 8; caudolateral armature of segment 8 (fig. 12, *h*) black and usually consisting of compact group of three to four sharply pointed spines, rarely of single or double spines; caudal swimming paddles well developed and sometimes bearing short spine at caudal tip besides usual many swimming hairs.

Larva: When full grown 7-12 mm. long. Head pale yellowish brown; antenna (fig. 12, *f*) rather slender, five-segmented (29: 8.5: 2.5: 3.5: 2), basal segment about 3.2 times as long as wide and with two very unequal trichoid sensillae, longer one reaching tip of antenna, segment 2 about three times as long as wide. Mandible mainly

pale, with four black, unequal cutting teeth, delicate preapical hairs arranged in line and four plumose large hairs; premandible (fig. 12, *e*) with two apical teeth slightly unequal; mentum (fig. 12, *d*) with 15 black teeth, median one large, second pair small, forming shoulders of median tooth, third tooth almost as large as median, fourth far smaller and basally fused with third tooth, following lateral four teeth gradually decreasing in size. Anterior pseudopod crowned with numerous pale-yellow claws, longer ones slender and minutely serrulate at extreme tips; posterior pseudopod crowned with 16 strong, simple, and golden yellow claws. Caudal tuft of hairs usually with seven equally long and two minute setae on basal small swelling; two pairs of very long lateral blood gills; four anal gills equally elongate oval, hardly as long as pseudopods. Other structures of immature stages as in my report on the specimens from Formosa (1939).

DISTRIBUTION: Formosa, S. Mariana Is., Caroline Is., Caroline Atolls, Marshall Is., Gilbert Is.

S. MARIANA IS. SAIPAN: Six females, three males, Chalan Kanoa, Aug. 1944, Hall; seven females, 16 males, Pt. Afenia, June 1946, Townes. ROTA: Pupa, 35 larvae, shallow sun pool in Sansan, July 1945, Frey. GUAM: Male, Pt. Oca, May 1945, Bohart and Gressitt; female, Nimitz Hill, May 1956, Clagg; male, Inarajan, Oct. 1957, Krauss; male, Merizo, Oct. 1957, Krauss; two female, two males, Feb. 1958, Krauss.

PALAU. BABELTHUAP: 17 females, 16 males, Ulimang, Oct.-Dec. 1947, Dybas. MALAKAL: Male, May 1957, Sabrosky; female, Sept. 1952, Krauss. PELELIU: Female, Mt. Amiangal, light trap, Dec. 1952, Gressitt; male, north corner, at light, Aug. 1945, Ducoff; three females, north end, light trap, May 1957, Sabrosky; female, Aug. 1945, Hagen; female, July 1945, Dybas. KOROR: Female, at light, Aug. 1952, Beardsley.

YAP. YAP: Three females, south and central, July-Aug. 1950, Goss; four females, four males, Hill behind Yaptown, light trap, Nov. 1952, Gressitt; female, Giliman, May 1957, Sabrosky; male, July-Aug. 1950, Goss; four females, male, Oct. 1952, Krauss. GAGIL-TOMIL: Two females, Gagil, June 1957, Sabrosky; two females, Tomil, July-Aug. 1950, Goss.

CAROLINE ATOLLS. LAMOTREK: Male, Lamotrek I., Feb. 1953, Beardsley. ULITHI: Seven females, Falalop I., Feb. 1953, Beardsley. WOLEAI: Female, Utagal I., July 1946, Townes; female, male, Utagal I., Sept. 1952, Krauss; female, Feb. 1953, Beardsley.

PONAPE. Ponape I.: Female, male, Agric. Expt. Sta., Colonia, light trap, Jan. 1953, Gressitt; female, Colonia-Palikir, July 1939, Esaki; female, Jan. 1953, Clarke. Sokehs I.: Female, Paipalap Pk., June-Sept. 1950, Adams.

KUSAIE: Female, Mutunlik, light trap, Jan. 1953, Gressitt.

MARSHALL IS. JALUIT: Female, Jabwar I., May 1958, Gressitt; five females, Pinlep I., Apr.-May 1958, Gressitt. MAJURO: 11 females, two males, pupa, 31 larvae, Uliga I., June 1950, La Rivers; female, Uliga I., Nov. 1953, Beardsley.

GILBERT IS. TARAWA: Three females, Teaoraoreke I., Nov. 1957, Krauss; female, Taborio I., Nov. 1957, Krauss.

43. Chironomus (Chironomus) crassicaudus Tokunaga, n. sp. (fig. 10, *e*).

Rather large yellow species with fore tibia and tarsus almost entirely dark, male scutum with four yellow vittae and two central oval brown spots on vittae and usually one small brown spot on either lateral vitta, female scutum with four distinct black vittae; wing with r-m and fR faintly brownish. Head with frontal tubercles very small, AR 2.59-2.85, female with last antennal segment slightly shorter than preceding two together; LR 1.49-1.56.

Male: Body about 3.71 mm. long; wings about 2.54 mm. by 0.68 mm. Head yellowish brown, with mouthparts brown, eyes rather widely separated above, frontal tubercles minute and as long as only one-half to one-third of diameter of facet; palp 5-segmented (15: 17: 40: 40: 58); antenna entirely brown, AR 2.75 (2.59-2.85), last segment pointed at apex. Thorax mainly yellow, scutum white and with four yellow vittae and four brown, oval or round spots: two spots on posterior half of median vittae and two on anterior parts of lateral vittae, but rarely lateral brown spots very faint, scutellum with six bristles, postscutellum brown. Legs yellow and dark; in fore leg, distal part of femur and following six segments entirely dark, but preapical part of tibia somewhat brownish, in mid leg, basal part of tibia dark, first tarsal segment pale brown and apically darkened, other tarsal segments all dark, in hind leg, knee part dark brown, first tarsal segment brown only on apical end, second brown and darkened apically, other tarsal segments all dark, LR 1.5 (1.47-1.52), RL-FT 89: 67. Wing with anterior veins pale brown, fR and r-m slightly more brownish, fMCu under origin of r-m, RL-V 86: 50: 85: 90. Halter yellow. Abdomen very pale yellow, but anterior four to five tergites with faint brownish clouds at middle and two posterior segments brownish. Hypopygium (fig. 10, *e*) dark brown, and point rather short and black, style large, oblong, not tapered and with numerous short but stiff setae on apical half of mesal side, dorsal appendage clawlike, with five to six setae on basal lateral swelling, bare projection slender, pointed or rarely slightly thickened apically, ventral appendage broad, with about 26 or more strongly curved apical bristles (some of them finely plumate apically) and setigerous with small erect setae on mesal side.

Female: Body about 4.26 mm. long; wings about 2.51 (1.85-2.91) mm. by 0.75 (0.57-0.87) mm. Rather variable in size, coloration generally darker, with more distinct dark markings than in male, scutum strongly shiny differing from that of male. Head with eyes separated above by one-fourth to one-fifth length of eye, palp five-segmented (about 15.7: 17.3: 43.7: 45.7: 66.3); antenna six-segmented (24.5: 50: 32: 35: 31.5: 59.5), with scape yellowish pale brown, second pale brown, following more brownish, last segment brownish fuscus, neck parts of intermediate flagellar segments as long as one-half of segments. Thorax mainly yellow, four scutal vittae and postscutellum black, pleural sclerites brownish, scutum shiny, rarely scutal vittae yellowish brown (immature?), scutellum with six to eight bristles and two to five small accessory setae. Legs with coloration similar to those of male, but darker, mid and hind tibiae sometimes brownish at tips, fore femur rarely almost entirely dark brown or brown, LR 1.54 (1.5-1.57), RL-FT 94.5: 74. Wing with fMCu just beyond or under r-m, RL-V 77.3: 53.7: 95.3: 83. Halter yellowish white. Abdomen mainly yellow, but one to two posterior segments slightly brownish, sometimes anterior four tergites with faint broad fuscus clouds; cercus pale brownish yellow.

Holotype, male (US 66551), Koror I., Palau, at light, Aug. 11, 1952, Beardsley. Allotype, female (US), Ulimang, Babelthuap I., Palau, Dec. 23, 1947, Dybas. Paratypes, two females, same locality as allotype, Dec. 19, 1947, Dybas; female, Koror I., Palau, data same as for holotype; male, Ngergoi I., Palau, Aug. 10, 1945, Hagen; four males, Kolonia, Yap, July-Aug. 1950, Goss; male, Hill behind Yaptown, 50 m., Nov. 1952, Gressitt; Koror I., Palau, light trap, Dec. 1, 1952, Gressitt; female, Gachapar, Gagil, Yap, light trap,

June 19, 1957, Sabrosky; two males, Yap I., July-Aug. 1950, Goss; male, As Mahetog, Saipan, at light, Nov. 18, 1944, Edgar.

Other specimens. S. Mariana Is.: Two females, Agiguan I., May 23, 1952, Dybas and Kondo; male, As Mahetog, Saipan I., at light, Apr. 1945, Dybas; three females, As Mahetog, Saipan I., Jan. 1-10 and May 1, 1945 and Dec. 5, 1945, Dybas; four females, E. Tanapag, Saipan I., Dec. 20, 1944 to Jan. 10, 1945, Dybas; three females, male, Saipan I., Dec. 2, 1944, Edgar; female, Guam I., Nov. 22, 1938, Oakley; four females, Pt. Oca, Guam I., Dec. 20, 1945, Gressitt; female, Nimitz Hill, Guam, May 4, 1956, Clagg. Palau: Female, Ulimang, Babelthuap I., Dec. 16, 1947, Dybas; male, Ngardmau, Babelthuap I., at light, Townes; female, Ngaremlengui, Babelthuap I., June 1, 1957, Sabrosky; female, Melekeiok, Babelthuap I., at light, May 22, 1957, Sabrosky; female, Imeliik, Babelthuap I., June 6, 1957, Sabrosky; female, E. Ngatpang, Babelthuap I., 65 m., light trap, Dec. 7, 1952, Gressitt; female, SW. Ulimang, Babelthuap I., Dec. 22, 1947, Dybas; female, Ngerkabesang I., Apr. 25, 1957, Sabrosky; female, SW. Koror I., Dec. 5, 1952, Gressitt; three females, Koror I., Sept. 1952, Krauss; four males, July-Aug. 26, 1952 and Dec. 1953, Beardsley; female, Mt. Amiangal, Peleliu I., light trap, Dec. 22, 1952, Gressitt; male, north end of Peleliu I., light trap, May 28, 1957, Sabrosky; female, east coast of Peleliu I., Jan. 27, 1948, Dybas; female, Peleliu I., July 30, 1945, Dybas; two females, Angaur I., Feb. 5, 1948, Dybas; male, Ngerkabesang I., Nov. 16, 1947, Dybas; three males, Ngaiangl Atoll, at light, May 9, 1957, Sabrosky; 14 females, eight males, Ngaiangl Atoll, light trap, Dec. 15, 1952, Gressitt; female, Ulebsehel I., by sweeping, Dec. 15, 1952, Beardsley. Caroline Atoll: Male, Satawan Atoll, Nov. 2, 1952, Beardsley. Yap: Seven females, Kolonia, Yap I., July-Aug., 1950, Goss; two females, male, Kolonia, Yap I., at light, June 8-21, 1957, Sabrosky; 10 females, six males, Hill behind Yaptown, Yap I., Nov. 28-Dec. 3, 1952, Gressitt; male, Yaptown, Yap I., June 12, 1946, Townes; male, Gagil, July-Aug. 1950, Goss; two females, Dugor, Weloy, Yap I., at light, Jan. 6, 1957, Sabrosky; male, Dugor, Weloy, Yap I., at light, June 14, 1957, Sabrosky; male, Rumu, Yap I., Nov. 29, 1952, Gressitt; male, S. Yap I., July-Aug. 1950, Goss; two females, central Yap I., Aug. 21, 1950, Goss; three females, male, Yap I., Oct. 1952, Krauss.

DISTRIBUTION: S. Mariana Is. (Agiguan, Saipan, Guam), Caroline Is. (Palau, Yap).

This species is similar to *C. claggi* in the coloration of both sexes, but rather easily distinguished by the structure of the male hypopygium, the scutal ornamentation in the male and the tergal coloration of the abdomen.

44. Chironomus (Chironomus) bicoloris Tokunaga, n. sp. (fig. 10, *f*).

Large yellow species, allied to *plumatisetigerus*, but distinguished from it by smaller frontal tubercles (at most as long as two facets) and dark brown subtriangular or oval markings of scutal vittae. AR about 3.1; LR 1.6-1.7; frontal tubercles small,

only as long as 1.5 times of diameter of facet in male and two facets in female; scutal vittae of thorax yellow and with four dark-brown spots, two of these spots elongate subtriangular on posterior half of median vittae and other two on anterior parts of lateral vittae; legs with knee parts dark brown, but knee joints very narrowly pale and usually posterior two pairs with knee parts faintly brownish, rarely tibial base without brown marking; tibial apical ends usually brownish, but in fore leg very faint and sometimes quite pale.

Male: Body 6.18-6.24 mm. long; wings 2.96-3.15 mm. by 0.8-0.82 mm. Head yellowish brown or yellowish pale brown, with mouthparts more brownish, frontal tubercles small, at most as long as 1.5 times diameter of facet, eyes separated above by one-seventh to one-eighth length of eye; palpal segments about 22.5: 17.5: 70.5: 84.5: 112.5; antenna with scape yellowish brown, flagellum and plumose hairs brown, AR 3.1 (3.08-3.11). Thorax mainly yellow, scutum pale yellow, with four yellow vittae and four subtriangular dark brown spots on vittae, scutellum pale yellow, with 15 to 17 bristles along caudal margin and 19 to 27 small setae scattered on anterior part, postscutellum dark brown on anterior half and yellow on caudal half. Legs mainly yellow or pale brownish yellow, but all knee parts dark brown and joints very narrowly pale, all tarsal segments apically brown, last one or two segments somewhat more brownish, fore tibia sometimes pale brown at tip, other tibiae usually more brownish at distal ends and sometimes basal brownish bands absent; LR about 1.69, RL-FT about 115: 99.5. Wing with veins very pale, but fR and r-m dark and covered by small dark spot, fMCu under end of r-m, RL-V 94.3: 70: 110: 94.3. Halter white or yellowish white. Abdomen pale brown, gradually fuscus brown caudad, tergites with somewhat T-shaped basal bands; hypopygium (fig. 10, *f*) brown, anal point slender, style slender, apical half suddenly tapered, dorsal appendage with basal pubescent part oval and setigerous, bare caudal projection not distinctly swollen or curved at tip, ventral appendage almost straight, slightly clavate, with 13 to 15 long curved apical bristles, some of these bristles finely plumose apically.

Female: Body about 6.76 mm. long; wings about 3.33 mm. by 0.98 mm. Generally similar to male, but lateral scutal vitta more brownish. Head with eyes separated above by one-sixth to one-seventh length of eye, frontal tubercles small and about as long as two facets; palpal segments about 25: 25: 85: 99: 143; antenna almost entirely pale brownish yellow, neck parts of intermediate flagellar segments as long as half of segments, six-segmented (25: 64: 45: 50: 41: 69). Scutellum with about 20 bristles along caudal margin and about 25 small setae scattered on anterior part. Leg with RL-FT about 130: 111. Wing with fMCu under origin of r-m, RL-V about 96: 87: 135: 102. Abdomen almost uniformly very pale brown or pale brownish yellow, anterior tergites 2 to 6 with very faint broad fuscus clouds, ultimate segment and cerci brown.

Holotype, male (US 66552), Dugor, Weloy, Yap I., light trap, June 1, 1957, Sabrosky. Allotype, female (US), Kolonia, Yap, at light, June 21, 1957, Sabrosky. Paratypes, two males, data same as for allotype.

Other specimens. Palau: Male, Ulimang, Babelthuap I., Dec. 16, 1947, Dybas; two males, Koror I., July 17, 1946, Townes; two females, male, Koror I., at light, Oct. 21 and Nov. 18 and 30, 1947, Dybas; male, SW. Koror I., light trap, Dec. 11, 1952, Gressitt; female, two males, Peleliu I., July 28-Aug. 1, 1945, Dybas. Yap: Female, male, Hill behind Yaptown, light trap, Dec. 1, 1952, Gressitt; male, Yap I., Oct. 1952, Krauss.

DISTRIBUTION: Caroline Is. (Palau, Yap).

A male from Yap seems to belong to this species except that it has a smaller AR (about 2.67); other characters are quite identical to the holotype.

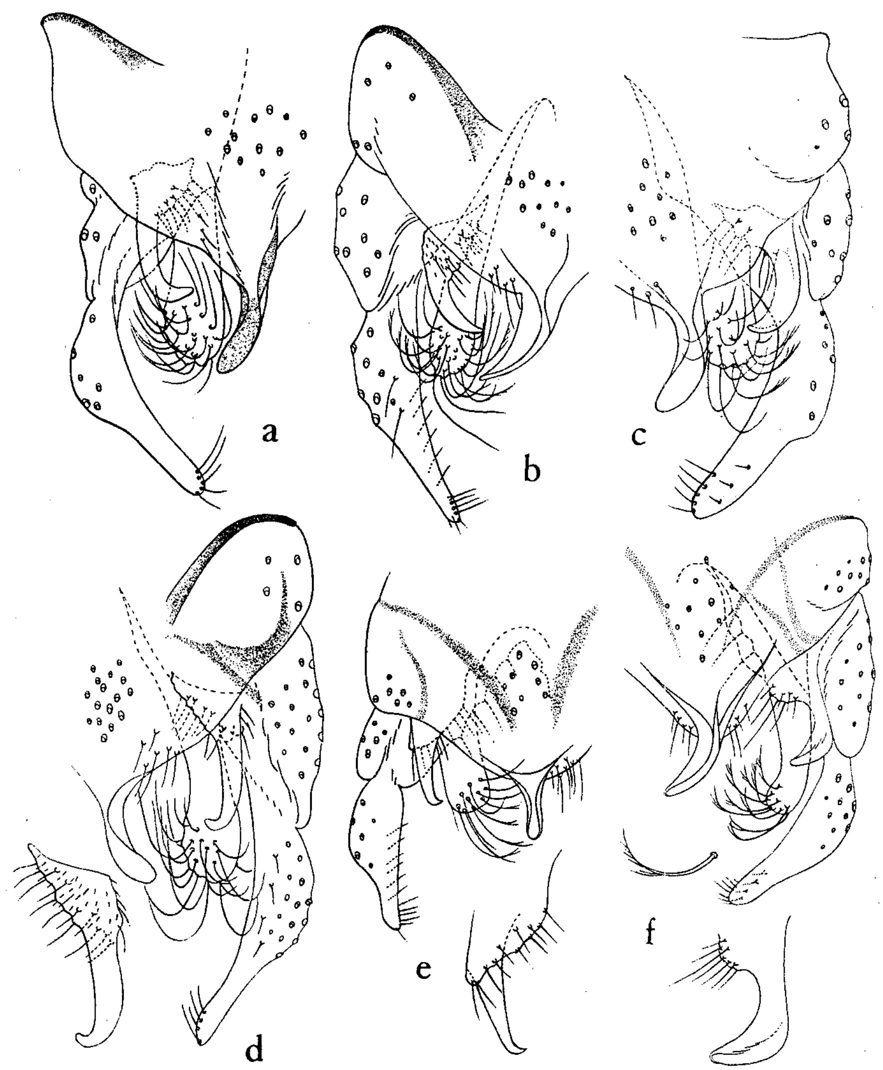


FIGURE 11.—*Chironomus* (s. str.), male hypopygia: **a**, *C. trifasciatus;* **b**, *C. praeapicalis;* **c**, *C. carolinense;* **d**, *C. nigerilateralis;* **e**, *C. javanus;* **f**, *C. claggi.*

45. Chironomus (Chironomus) plumatisetigerus Tokunaga, n. sp. (fig. 10, *g*).

Large yellowish species, very closely allied to *bicoloris*, from which it may be separated by differences of scutal vittae and stripes, the abdominal tergal marking, and development of frontal tubercles. Head with frontal tubercles large, fingerlike and longer than two facets; AR 3.02-3.41, last segment of female antenna usually shorter than preceding two segments together; scutal vittae yellow, with dark stripes along lateral sides of vittae slender in male and somewhat broadened in female; LR 1.54-1.64, legs mainly yellow, but knee parts of all legs dark or brown (broadly in fore leg, narrowly in other legs), all tarsal segments distinctly dark at tips; wing with fR and r-m not more distinctly fuscus or brownish than other veins. Male hypopygium of *dorsalis* type, but apical bristles of ventral appendage finely branched plumosely at tips; abdominal tergites with large pale ill-defined fuscus spots at least on segments 2 to 6.

Male: Body about 5.0 mm. long; wings about 2.47 mm. by 0.65 mm. Head yellowish brown, with mouthparts brown, eyes separated above by about one-fifth length of eye, frontal tubercles large, subcylindrical, and longer than width of two facets together; palp five-segmented (about 14: 15: 68: 70: 77); antenna with scape brown, flagellum paler at base and gradually browned apically, plumose hairs pale yellow, AR 3.24 (3.02-3.41). Thorax yellow or white, four scutal vittae yellow, median vittae with fuscus slender stripes on outer lateral margins, lateral vittae surrounded by fuscus stripes, postscutellum pale brown on caudal half and far paler on anterior half, scutellum with about 14 bristles along caudal margin and about 14 small setae scattered on anterior part. Legs mainly yellow, knee part of fore leg broadly dark brown or brownish, those of other posterior legs narrowly brown and sometimes tibiae quite pale, fore tibia without apical dark end, but mid and hind tibiae often dark or brownish apically, all tarsal segments obviously dark at tips and apical two or three segments uniformly more brownish than in basal; pulvilli large, LR about 1.61, RL-FT about 91: 80. Wings with anterior veins pale yellow, fR and r-m not distinctly more tinged than in other veins, fMCu just before end of r-m, RL-V 80: 55: 89: 80. Halter white. Abdomen yellowish white, somewhat brownish on posterior three segments, tergites 1 to 6 usually with single large oval pale fuscus spots; hypopygium (fig. 10, *g*) yellowish brown or brown, with anal point rather slender, styles small and slender, dorsal appendage strongly curved at tip, somewhat broadened preapically and with 8 to 10 basal setae, ventral appendage almost straight, not distinctly capitate and with 11 apical bristles finely plumose at tips.

Female: Body 5.0 (4.06-6.11) mm. long; wings 2.53 (2.28-2.78) mm. by 0.85 (0.75-0.91) mm. Coloration closely as in male, but dark markings more obvious than in male and scutal dark stripes on yellow vittae broader than in male. Palp five-segmented (about 19.3: 16.3: 75: 83.8: 112.8); antenna brown or yellowish brown, but second segment paler, last segment more brownish or fuscus, neck parts of intermediate flagellar segments slender and about as long as basal bulbs, six-segmented (24.6: 53.6: 39: 40.2: 38.8: 71.6). Thorax largely yellow, lateral dark stripes of median vittae broadened on caudal halves, marginal dark lines of lateral vittae broadened on anterior parts, pleural and sternal sclerites pale brownish, scutellum with 10 to 14 bristles and 9 to 13 small setae. LR 1.6 (1.54-1.64), RL-FT 109.7: 91.3. Wing with fR and r-m slightly more brownish than other veins, fMCu under r-m, RL-V 78.2: 63: 103.2: 83.4. Abdomen mainly yellow, posteriorly dark brownish, tergites with large obscure pale fuscus spots.

Holotype, male (US 66553), Koror I., Palau, at light, Apr. 14, 1953, Beardsley. Allotype, female (US), Koror I., Palau, at light, Aug. 11, 1952, Beardsley. Paratypes, female, male, Agana, Guam, Oct. 19, 1952, Krauss; two females, Ulimang, Babelthuap I., Palau, Dec. 18, 1847, Dybas; two females, Imeliik, Netkeng, Babelthuap I., light trap, June 6 and July 6, 1957,

Sabrosky; two males, SW. Koror I., Palau, light trap, Dec. 4 and 11, 1952, Gressitt; two females, Hill behind Yaptown, Yap I., light trap, Nov. 28-Dec. 2, 1952, Gressitt; female, Dugor-Rumu, Yap I., Nov. 29, 1952, Gressitt; female, Gachapar, Gagil, Yap, light trap, June 19, 1957, Sabrosky.

Other specimens. Palau: Female, Koror I., Sept. 1952, Krauss; two females, Koror I., Nov. 24, 30, 1947, Dybas; 14 females, six males, Koror I., at light, July-Sept. 1952 and Apr.-June 1953, Beardsley; two females, Koror I., at light, Apr. 13, 22, 1957, Sabrosky; two males, SW. Koror I., light trap, Dec. 4-14, 1952, Gressitt; three females, SW. Ulimang, Babelthuap I., at light, Dec. 1947, Dybas; female, Ngaremlengui, Babelthuap I., at light, June 2, 1957, Sabrosky; male, Ngerehelong, Babelthuap I., at light, May 6, 1957, Sabrosky; male, Lake Ngardok, Babelthuap I., at light, May 22, 1957, Sabrosky; three females, male, Peleliu I., July 28-Aug. 1, 1945, Dybas; female, male, Peleliu I., Jan. 1948, Dybas. Yap: Male, Yaptown, Yap I., July 13, 1946, Townes; six females, Kolonia, Yap I., May 1, 1949, Maehler; male, Kolonia, Yap I., Mar. 29, 1954, Beardsley; six females, Gagil-Tomil Distr., July-Aug. 1950, Goss; 17 females, five males, Hill behind Yaptown, Yap I., light trap, Nov. 28-Dec. 3, 1952, Gressitt; female, S. Rumung I., July-Aug. 1950, Goss.

DISTRIBUTION: S. Mariana Is. (Guam), Caroline Is. (Palau, Yap).

Two female specimens from Yap Island are thought to be varieties of this species, differing only in having uniformly orange-yellow or very pale brownish-yellow scutal vittae.

46. Chironomus (Chironomus) trifasciatus Tokunaga, n. sp. (fig. 11, *a*).

Large yellow and dark-brown species similar to *plumatisetigerus,* from which it may be distinguished by the reduced suboval frontal tubercles, smaller AR, more slender dorsal appendage of male hypopygium and slight differences in color markings of thorax and abdomen. Frontal tubercles as long as width of one or two facets together; AR 1.87-2.0; scutum with yellow vittae and fuscus slender stripes along outer lateral sides of vittae, postscutellum dark anteriorly and pale posteriorly; legs with all knee parts, distal ends of tibiae, and tarsal segments distinctly dark, LR 1.66-1.74; wing with fR and r-m dark and covered by small dark spot; abdomen largely yellow, but tergites 2 to 4 with distinct dark T-shaped basal bands; male hypopygium with dorsal appendage long, slender, and curved apically.

Male: Body 4.16-5.46 mm. long; wing 2.28-3.09 mm. by 0.72-0.91 mm. Head brown or dark brown, eyes separated above by width of four facets or one-sixth length of eye, frontal tubercles oval and as long as diameter of a facet; palp darker, five-segmented (17.5: 20: 56.5: 68: 82.5); antenna with scape yellowish brown, flagellum and plumose hairs brown, AR 1.87-2.0. Thorax largely yellow, pleural sclerite under wing base and sternum brownish yellow, scutum mainly white, with yellow vittae, fuscus slender stripes along outer lateral sides, stripes of median and lateral vittae connected with each other by additional fuscus cloud behind humeral area, scutellum brown on lateral sides, pale yellowish brown on middle part, with 11 to 15 bristles along caudal margin and 13 to 25 small setae scattered on anterior part, postscutellum mainly brown, but yellow on caudal end. Legs mainly yellow, with distinct dark bands at distal ends of segments and bases of tibiae, except for coxae and trochanters, fore tibia broadly dark on basal half; LR 1.69-1.74, RL-FT 104: 82.5, pulvilli large. Wing with anterior veins brownish, fR and r-m dark and covered by small fuscus spot,

fMCu under end of r-m, RL-V 84.5: 57.5: 94.5: 83. Halter white or yellowish white. Abdomen mainly yellow, basal tergites 2 to 4 with large T-shaped dark basal bands, following tergites very faintly fuscus on basal areas; hypopygium (fig. 11, *a*) yellowish brown, with anal point rather slender, dark brown and curved ventrad, style also slender, dorsal appendage setigerous on basal area, slender, curved only on apical part and not broadened preapically, ventral appendage stout, slightly clavate and with 18 to 19 simple strong apical bristles.

Female: Body length about 6.11 mm.; wings about 3.2 mm. by 0.96 mm. Coloration similar to that of male, but dark stripes along outer lateral sides of yellow scutal vittae broader than in male. Eyes separated above by one-seventh length of eye, frontal tubercles thumblike and as long as width of two facets together; palp five-segmented (about 20: 22: 80: 90: 127); antenna entirely brown, neck parts long and about one-half of segments, six-segmented (17: 51: 38: 42: 39: 54). Scutellum with about 16 caudal bristles and 45 small scattered setae. Legs with very distinct black bands on yellow ground color, LR about 1.66, RL-FT about 132: 105. Wing with fMCu under r-m, RL-V 92: 80: 128: 97. Abdomen mainly pale yellow, basal tergites 2 to 4 with basal fuscus bands, last caudal segment and cerci pale brownish yellow.

Holotype, male (US 66554), Colonia, Ponape, Aug. 9, 1946, Townes. Allotype, female (US), Agric. Expt. Sta., Colonia, Ponape, Jan. 7, 1953, Gressitt. Paratype, male, data same as for allotype.

Other specimens. Ponape: Two females, Agric. Expt. Sta., Colonia, light trap, Jan. 10-11, 1953, Gressitt.

DISTPIBUTION: Caroline Is. (Ponape).

47. Chironomus (Chironomus) praeapicalis Tokunaga, n. sp. (fig. 11, *b*).

Large yellowish pale-brown species somewhat related to *trifasciatus,* but paler and legs with only very small preapical fuscus rings on femora and broad subbasal fuscus band on fore tibia and without dark bands at tips of tarsal segments, abdomen with tergal fuscus basal bands on segments 2 to 6 or 2 to 8, in male scutum with vittae yellow and in female yellow vittae somewhat brownish. AR about 3.15; post-scutellum basally brown and caudally yellow, legs almost entirely yellow, all femora with small preapical fuscus rings, fore tibia with subbasal fuscus band, LR about 1.58; abdomen pale brown or yellow, male with T-shaped fuscus basal bands on segments 2 to 6, female with triangular fuscus median basal spots on segments 2 to 8; male hypopygium with dorsal appendage with basal setigerous part large and apical bare projection small, clawlike and slightly arcuate.

Male: Body about 6.96 mm. long; wings about 3.19 mm. by 0.9 mm. Head entirely brown, with frontal tubercles cylindrical and as long as width of two facets together, eyes separated above by one-fourth length of eye; palp five-segmented (15: 15: 65: 83: 90); antenna with scape yellowish brown, flagellum and plumose hairs brown, AR about 3.15. Thorax mainly pale brownish yellow, scutum white, with vittae yellow and fuscus just behind head, postscutellum brownish on anterior part and yellow on caudal part, scutellum with 13 bristles along caudal margin and 24 small setae scattered on anterior part, pleural sclerite beneath wing base fuscus. Legs with coxae and trochanters pale brownish yellow, other segments mainly yellow, last tarsal segment slightly fuscus, all femora with small preapical dark rings, fore tibia with sub-basal broad dark band, distal ends of tibiae and tarsal segments very faintly fuscus, LR about 1.58, RL-FT 126: 111. Wing with veins pale brown, fR and r-m dark and covered by small dark spot, fMCu under r-m, RL-V 102: 71: 113: 100. Halter white. Abdomen very pale brown, with T-shaped fuscus basal bands on tergites 2 to 6; hypopygium (fig. 11, *b*) pale brown, with anal point slender and curved ventrad, style tapered beyond middle, dorsal appendage with basal part large and setigerous, apical

bare projection rather small and clawlike, ventral appendage stout, with 13 to 15 strong apical bristles, some of which are finely plumose at tips.

Female: Body length about 6.16 mm.; wings 3.16-3.9 mm. by 0.96-1.26 mm. Coloration and structure generally as in male with usual sexual differences, but scutal vittae pale brownish yellow, abdomen with tergal spots triangular. Palp five-segmented (20.3: 23.3: 77: 86.7: 132); antenna with scape yellowish brown, flagellum yellow, but last segment and neck parts of penultimate two segments fuscus, six-segmented (26.7: 66: 46.3: 54.7: 44: 81.7), neck parts of intermediate flagellar segments about one-half of segments. Scutellum with more bristles and setae than in male. RL-FT 148.7: 122.3. Wing with RL-V 98: 84.5: 135: 103.5.

Holotype, male (US 66555), Ngarsung, Airai, Babelthuap I., Palau, light trap, May 16, 1957, Sabrosky. Allotype, female (US), Ulimang, Babelthuap I., Palau, at light, Dec. 10, 1947, Dybas. Paratypes, female, Ngaremlengui, Babelthuap I., Palau, June 2, 1957, Sabrosky; female, same place as for allotype, Dec. 19, 1947, Dybas.

Other specimens. Palau: Three females, Ngeremlengui, Babelthuap I., June 1-3, 1957, Sabrosky; female, Ngerimal, Airai, Babelthuap I., May 26, 1957, Sabrosky. Yap: Female, Kolonia, Yap I., June 21, 1957, Sabrosky. Ponape: Male, Agric. Expt. Sta., Colonia, June-Sept., 1950, Adams.

DISTRIBUTION: Caroline Is. (Palau, Yap, Ponape).

48. Chironomus (Chironomus) claggi Tokunaga, n. sp. (figs. 11, *f*; 12, *i, j*).

Large yellow and dark-brown or brown species, allied to *crassicaudus* in coloration and to *carolinense* in structure of male hypopygium. Separable from *crassicaudus* by the longer frontal tubercles, larger LR, and different structure of hypopygium and from *carolinense* easily by the different characteristic coloration. Head with frontal tubercles subcylindrical and longer than width of 1.5 facets; AR 2.5-2.85; LR 1.66-1.81. Scutal vittae of male entirely yellow, of female entirely brown, fore leg with distal part of femur and entire following segments more or less brownish or black, abdominal tergites with brownish bands or uniformly brownish; male hypopygium of *dorsalis* type.

Male: Body 5.33 (5.01-5.66) mm. long; wings 2.67-2.69 mm. by 0.68-0.72 mm. General coloration yellow and with tarsi, knees, and tergal bands of abdomen fuscus or brown. Head pale brown, with frontal tubercles cylindrical and about as long as width of two facets, eyes separated above by about one-fifth of length of eye; palp brown and five-segmented (15.5: 16.5: 70.5: 70.5: 84); antenna with scape yellowish brown, other segments and plumose hairs brown, AR 2.7 (2.5-2.85). Thorax widely yellow, scutum white and with four entirely yellow vittae, postscutellum brown, scutellum with 10 to 11 bristles along caudal margin and 9 to 11 small setae on anterior part. Legs with coxae and trochanters usually yellow, but those of fore leg sometimes pale brownish, all femora mainly yellow, but apically brownish, fore tibia mainly dark and apically brownish, other tibiae dark only on basal parts and extensively pale brown, but rarely bases slightly more brownish than other parts, fore tarsal segments entirely black or dark brown, other tarsal segments pale or yellowish brown on basal one or two segments but their apical part black or more brownish as in following apical segments; LR 1.7 (1.66-1.77) and RL-FT 108.7: 89. Wing with fR and r-m not darker than other veins, fMCu under r-m, RL-V 86: 61.5: 100.5: 89. Halter white. Abdomen mainly very pale brown, but tergites of segments 2 to 6 with basal bands brown and broad, other caudal segments uniformly brown; hypopygium (fig. 11, *f*) brown, with anal point curved ventrad, style rather slender, dorsal appendage with five to seven basal bristles and bare apical projection short, broadened preapically and curved mesad apically, ventral appendage rather long,

slightly capitate and with 9 to 11 apical strong bristles, most of which are finely bi- or trifurcate apically.

Female: Body 5.2-6.24 mm. long; wings 3.04 mm. by 0.89 mm. Thorax with four brown scutal vittae, pleural sclerites beneath wing base and sternum brownish, legs more extensively and intensely fuscus, differing from male. Head with frontal tubercles about 1.5 times as long as diameter of facet; palp five-segmented about 20: 18: 70.5: 82.5: 107; antenna with scape yellow, other segments almost entirely fuscus, neck parts of intermediate segments long, as long as basal bulbs, RL-A 23: 49.5: 38.8: 41.8: 48.5: 62.3. Scutellum with about 12 bristles and 7 to 10 small setae. LR about 1.81 and RL-FT about 128.5: 99.5. Abdomen mainly yellow, with dark tergal bands almost on all segments, but caudal two segments dark brown.

Pupa: Body about 7 mm. Frontal tubercle (fig. 12, *i*) with basal blunt swelling and small apical spinelike pale yellowish-brown projection, which bears small lateral seta. Abdominal surface very weakly spinulous; tergite 2 with about 71 yellow simple hooklets arranged in single line on caudal margin, sternite 4 with lateral groups of spinules hardly visible; three lateral swimming hairs on either lateral side of segments 5 to 6 and four on segments 7 to 8, caudal swimming paddles semicircular; lateral caudal armature (fig. 12, *j*) black, consisting of five to six lateral and three to five apical spines.

Holotype, male (BISHOP 3373), Futami-ko, Chichi Jima, Bonin Is., May 10, 1956, Clagg. Allotype, female (BISHOP), data same as for holotype. Paratypes, female, four males, Camp Beach, Omura, Chichi Jima, Bonin Is., Apr. 2-25 to June 9, 1958, Snyder; female, Sen Zan (Northeast Bay), Ani Jima, Chichi Jima Group, Bonin Is., May 28, 1958, Snyder; female, Gen.'s beach, Minato-ko, Yatsuse Reg., Chichi Jima, Bonin Is., Apr. 10-22, 1958, Snyder; female, male, Nimitz Hill, Guam, May 4, 1956, Clagg; female, Koror I., Palau, Apr. 18, 1957, Sabrosky; male, Colonia, Ponape, Aug. 9, 1946, Townes; female, pupa, Wake I., 1955, Fosberg.

Other specimens. Guam: Two females, two males, Nimitz Hill, May 4, 1956, Clagg.

DISTRIBUTION: Bonin Is. (Chichi Jima), S. Mariana Is. (Guam), Caroline Is. (Ponape), Wake I.

49. **Chironomus (Chironomus) carolinense** Tokunaga, n. sp. (fig. 11, *c*).

Large yellow species, male similar to *claggi* in general appearance. Thorax entirely yellow, fore leg with knee part broadly fuscus, all tarsal segments usually black or brownish, wing with fR and r-m at most only slightly more brownish than other veins, abdomen yellowish brown, without fuscus or brown spots or bands. Head with frontal tubercle well-developed; AR 2.05-2.15.

Male: Body 4.68-5.4 mm. long; wings 2.65-2.89 mm. by 0.64-0.69 mm. Head yellowish brown, with eyes separated by one-fifth of length of eye, frontal tubercles oblong and about as long as width of 1.5 facets; palp 5-segmented (17.5: 14.5: 66.5: 76.5: 108); antenna with scape yellowish brown, other segments brown, AR 2.1 (2.05-2.15). Thorax almost entirely yellow, but scutum white and with vittae yellow, scutellum with 12 bristles and 8 to 11 small setae. Legs mainly yellow and dark brown, fore femur dark on apical end, fore tibia dark on basal one-third, tarsal segments missing, but probably brownish uniformly, other posterior legs with tarsi dark brown or basal one or two segments somewhat paler on basal parts; RL-FT 106: 87.7. Wing with fR and r-m not more fuscus than other veins, fMCu just beyond origin of r-m, RL-V 82: 63.5: 106: 90.5. Halter white. Abdomen entirely yellow, only lightly brown

on caudal segments; hypopygium (fig. 11, *c*) with anal point slightly curved ventrad, style normal, dorsal appendage setigerous on basal part, with apical bare projection slightly curved, not dilated apically, ventral appendage stout and with 10 to 16 strong apical bristles, some of which are finely plumose at tip.

Female: Body about 4.94 mm. long; wings about 2.69 mm. by 0.81 mm. Resembles male, except all knee parts fuscus, tibial apices slightly fuscus, tarsal segments largely fuscus and apical ends dark. Five palpal segments about 15: 14: 62: 73: 106; antenna pale brown, but fuscus on last segment, six-segmented (20: 44: 34: 39: 38: 53). Post-scutellum slightly brownish. RL-FT about 112: 87. Wing with fR and r-m somewhat more brownish than other veins, fMCu under origin of r-m, RL-V 80: 60: 104: 87. Abdomen yellow, but last two segments and cerci yellowish brown, no bands or spots.

Holotype, male (US 66556), Mt. Temwetemwensekir, Ponape, by sweeping, Feb. 29, 1948, Dybas. Allotype, female (US), Ulimang, Babelthuap I., Palau, Dec. 25, 1947, Dybas. Paratypes, male, near Colonia, Ponape, Aug. 8, 1946, Townes; male, SE. Nanpohnmal, Ponape, Jan. 11, 1953, Gressitt.

DISTRIBUTION: Caroline Is. (Palau, Ponape).

This species is similar to *claggi* in general appearance, but is paler; the abdomen is almost uniformly yellowish, lacking fuscus or brown bands or spots; the dorsal appendage is not dilated apically.

50. Chironomus (Chironomus) nigerilateralis Tokunaga, n. sp. (fig. 11, *d*).

Large yellow species with abdominal sides dark and anterior three to four abdominal tergites with large oval fuscus spots, thus coloration is similar to *javanus*, but legs entirely yellow unlike *javanus* and other similar species. Head with very well developed frontal tubercles, AR 1.8-2.22, LR 1.66-1.96 in male and 1.52 in female. Thorax mainly yellow, scutum with four yellow vittae, scutellum highly setigerous; wing with fR and r-m dark and covered by small fuscus spot. Male hypopygium with style very slender, dorsal appendage elongate, tapered and strongly curved only at extreme tip.

Male: Body length 6.54 (5.33-7.8) mm.; wings 3.3 (3.04-3.54) mm. by 0.85 (0.81-0.91) mm. Head brown or yellowish brown, with mouthparts dark, eyes separated above by one-seventh length of eye, frontal tubercles oval and longer than two facets together; palp five-segmented (23: 21.7: 83.7: 98.3: 144.3); antenna with scape orange yellow, other parts brown, AR 1.98 (1.8-2.22). Thorax almost pale yellow, four scutal vittae yellow, scutellum pale brownish yellow and highly setigerous with many scattered bristles and setae, postscutellum yellow and only brown at middle. Legs entirely yellow, only last tarsal segment brown, LR 1.81 (1.66-1.96), RL-FT 154.5: 116. Wing with veins very pale yellow, with fR and r-m dark and covered by small dark spot, fMCu under r-m, RL-V 105: 85: 133: 109. Halter white. Abdomen mainly yellow, with pair of dark lateral stripes on segments 1 to 7, segments 2 to 5 with fuscus oval tergal spots, that of segment 4 darkest and of 5 faintest; two caudal segments and hypopygium pale brownish yellow; hypopygium (fig. 11, *d*) with anal point curved ventrad, style slender on apical half, dorsal appendage rather long, basally setigerous, with bare caudal projection almost straight, tapered and only strongly curved at extreme tip; ventral appendage large, slightly clavate and with 19 to 21 strong apical bristles, some of which are finely plumose apically.

Female: Body from 4.29 mm. to 8.58 mm. long; wings 2.78-4.36 mm. by 0.85-1.34 mm. Coloration very similar to that of male. Head with eyes narrowly separated above, frontal tubercles oval and longer than width of two facets together; palp 5-segmented (21.5: 22.5: 85: 98.5: 157); antenna with scape yellow, flagellum very pale brown, but neck parts dark. Thorax with pleural sclerites beneath wing base brownish. LR about 1.52. Wing with RL-V about 96: 91: 139: 101.5. Abdomen with lateral dark

stripes paler on caudal segments in some specimens, tergal dark spots always present on segments 3 to 4, on other segments often very faint or almost absent, in darker specimens median spots connected with lateral stripes forming bands on anterior parts of tergites, two caudal segments and cerci pale brown.

Holotype, male (US 66557), Mt. Dolen Nankep, Ponape, Aug. 10, 1946, Townes. Allotype, female (US), Mt. Temwetemwensekir, 180 m., Ponape, light trap, Jan. 6, 1953, Gressitt. Paratypes, male, same locality as allotype, Jan. 18, 1953, Gressitt; male, Agric. Expt. Sta., Colonia, Ponape, light trap, Jan. 20, 1953, Gressitt; female, near Colonia, Ponape, Aug. 8, 1946, Townes.

Other specimen. Ponape: Female, Palikir-Rohnkiti, July 17, 1939, Esaki.

DISTRIBUTION: Caroline Is. (Ponape).

51. Chironomus (Chironomus) javanus Kieffer (fig. 11, *e*).

Chironomus javanus Kieffer, 1924, Soc. Sci. Bruxelles, Ann. **43**: 263.—Johannsen, 1932, Archiv Hydrobiol. Suppl. 11, Tropische Binnengewässer **3**: 536.

Large yellow species with distinctive leg coloration, all tarsal joints dark, both ends of tarsal segments dark, both sexes with scutal vittae of thorax entirely yellow, frontal tubercles well developed; AR 2.9-3.14; LR 1.66-1.73.

Male: Body about 4.2-5.01 mm. long; wings 2.37 (2.07-2.73) mm. by 0.63 (0.59-0.73) mm. Head yellowish brown, with mouthparts dark brown, eyes separated above by about one-fourth length of eye, frontal tubercles oblong, about as long as two or three facets; palp five-segmented (about 13: 13.7: 47.7: 60: 68); antenna brown, with plumose hairs paler, AR 3.04 (2.9-3.14). Thorax almost entirely yellow, scutum white and vittae yellow, scutellum with about eight bristles and two small setae. Legs largely yellow, tarsi with distinct dark bands covering all tarsal joints, tarsal segment 4 brownish, 5 entirely dark; LR 1.7 (1.66-1.73), RL-FT 87.3: 74.5. Wing with veins colorless, hyaline, with fR and r-m black, usually covered by conspicuous dark spot, fMCu under r-m, RL-V 73: 51.5: 85.3: 76.3. Halter yellowish white or yellowish pale brown. Abdomen entirely yellow; hypopygium (fig. 11, *e*) with anal point small and slender, style small, dorsal appendage with basal part rather well developed, produced slightly beyond base of apical bare projection and setigerous with about 10 setae, apical lobe almost straight, tapered and curved only at extreme apex, ventral appendage short, stout, with about 10 to 14 strong apical bristles, some of these bristles apically bifid.

Female: Body about 4.88 mm.; wings 2.57 (2.08-2.93) mm. by 0.83 (0.66-0.96) mm. Similar to male with usual sexual differences. Palp five-segmented (about 14.7: 14: 51: 67: 87); antenna largely yellow, last segment brown, neck parts almost as long as one-half length of segments, six-segmented (20.2: 45.8: 31: 33.6: 34.2: 53.4). Postscutellum slightly brownish, scutellum with about six to nine bristles and none to six small setae. Legs usually with coxae and trochanters very slightly brownish, last two tarsal segments entirely dark brown or black, RL-FT 101.2: 81.6. Wing with RL-V 70.3: 63: 104.5: 78.5. Abdomen mainly yellowish white, pale brownish on caudal segments including cerci.

DISTRIBUTION: Java, Caroline Is., Marshall Is.

PALAU. BABELTHUAP: Male, Ngerehelong, May 1957, Sabrosky; male, Melekeiok, light trap, May 1957, Sabrosky; four males, Ngiwal, July 1946, Townes. KOROR: Three males, Nov. 1947, Dybas; female, male, Sept. 1952, Krauss; female, male, SW. Koror I., light trap, Dec. 1952, Gressitt; female,

Sept. 1952, Beardsley; three females, four males, at light, Apr. to May 1953, Beardsley; two females, July 1956, McDaniel; seven females, three males, at light, Apr.-May 1957, Sabrosky. NGAIANGL: Male, at light, May 1957, Sabrosky.

YAP. YAP: Male, Yaptown, July 1946, Townes; female, Hill behind Yaptown, light trap, Nov. 1952, Gressitt.

TRUK. WENA (Moen): Male, July 1946, Townes.

MARSHALL IS. KWAJALEIN: Male, light trap, Sept. 1956, Clagg.

52. Chironomus (Chironomus) samoensis Edwards (fig. 12, *a*).

Chironomus samoensis Edwards, 1928, Insects of Samoa **6** (2): 67.

Chironomus dorsalis, Tokunaga, 1940, Philippine Jour. Sci. **71**: 220.

Chironomus eximius Johannsen, 1946, B. P. Bishop Mus., Bull. **189**: 193.

Large yellow species, scutal vittae yellow; legs yellow, but all tarsal segments apically black or brown; frontal tubercles cylindrical or oblong; AR 2.7-3.09; LR 1.75-1.92, in female fore tarsus with segment 4 far longer than 3 and slightly longer than 2; wing with fR and r-m usually more brownish or fuscus than other veins; abdomen pale brownish yellow or yellow, tergites of basal segments 2 to 6 of male and 2 to 4 of female with round or rhombic pale fuscus spots; male hypopygium of *dorsalis* type.

Male: Body about 4.5 mm. long; wings 2.2-2.3 mm. by 0.59-0.61 mm. Almost entirely yellow. Head with mouthparts pale brownish yellow, eyes separated above by one-fourth length of eye, frontal tubercles subcylindrical and slightly shorter than width of two facets; palp five-segmented (about 15.7: 14: 62.7: 69.3: 100); antenna with scape yellowish brown, other segments brown, plumose hairs very pale brown, AR 2.86 (2.7-3.09). Thorax mainly yellow, scutum white, with vittae yellow, scutellum white, with 9 to 10 bristles along caudal margin and seven to nine small setae on anterior part, postscutellum faintly fuscus on middle part. Legs yellow, only dark or brown at distal ends of all tarsal segments; LR 1.81 (1.75-1.84), RL-FT 85: 70. Halter yellowish white. Wing with fR and r-m usually somewhat fuscus, fMCu under origin of r-m, RL-V 72: 49.5: 81.5: 75.2. Abdomen pale brownish yellow, basal segments 2 to 6 with oval or rhombic faint spots on tergites; hypopygium (fig. 12, *a*) of *dorsalis* type, anal point rather large, style normal, dorsal appendage setigerous (with eight to nine setae) on basal part and bare caudal projection stout and subtriangular, ventral appendage stout, with 12 to 18 strong apical bristles, some of these bristles bifid or trifid apically.

Female: Body 4.92 (4.68-5.07) mm. long; wings 2.88 (2.52-3.12) mm. by 0.84 (0.78-0.91) mm. Similar to male in color and structure with usual sexual differences. Head with eyes separated above by one-sixth length of eye, frontal tubercles oblong; palp five-segmented (13.5: 12.5: 57.5: 70: 87); antenna with scape and basal two-thirds of segment 2 yellow, other parts fuscus, neck parts rather long, six-segmented (22: 49.5: 38: 39.5: 37.3: 55.3). Scutellum with 13 to 14 bristles and 8 to 11 small setae. LR 1.86-1.92, RL-FT 110: 86.5, RL-T 163.5: 84.5: 81.5: 88.5: 38.5. Wing with fMCu under or just beyond origin of r-m, RL-V 85.3: 67.3: 110: 92.7. Abdomen yellow, with tergal oval faint fuscus spots on segments 2 to 4.

DISTRIBUTION: Samoa, Java, S. Mariana Is., Caroline Is., Marshall Is.

S. MARIANA IS. AGIGUAN: Female, at light, June 1952, Kondo. GUAM: Female, Agana, Aug. 1945, Dybas.

PALAU. BABELTHUAP: 16 males, Ulimang, Dec. 1947, Dybas; male, Ngerehelong, Dec. 1947, Dybas; two males, Ngiwal, at light, May 1957, Sabrosky; female, Melekeiok, at light, May 1957, Sabrosky. KOROR: Two males, Nov.-Dec. 1947, Dybas. NGERGOI: Male, Aug. 1945, Danziger.

YAP. YAP: Male, Hill behind Yaptown, light trap, Dec. 1952, Gressitt; male, Mt. Madaade, 60 m., light trap, Dec. 1952, Gressitt; male, Kolonia, at light, June 1957, Sabrosky.

TRUK. TON: Male, Mt. Unibot, light trap, Jan. 1953, Gressitt. WENA (Moen): Two females, Mt. Chukumong, Mar. 1949, Potts; male, Mt. Chukumong, light trap, Feb. 1953, Gressitt; three females, June 1946, Townes. TONOAS: Two females, male, Jan. 1936, Ono.

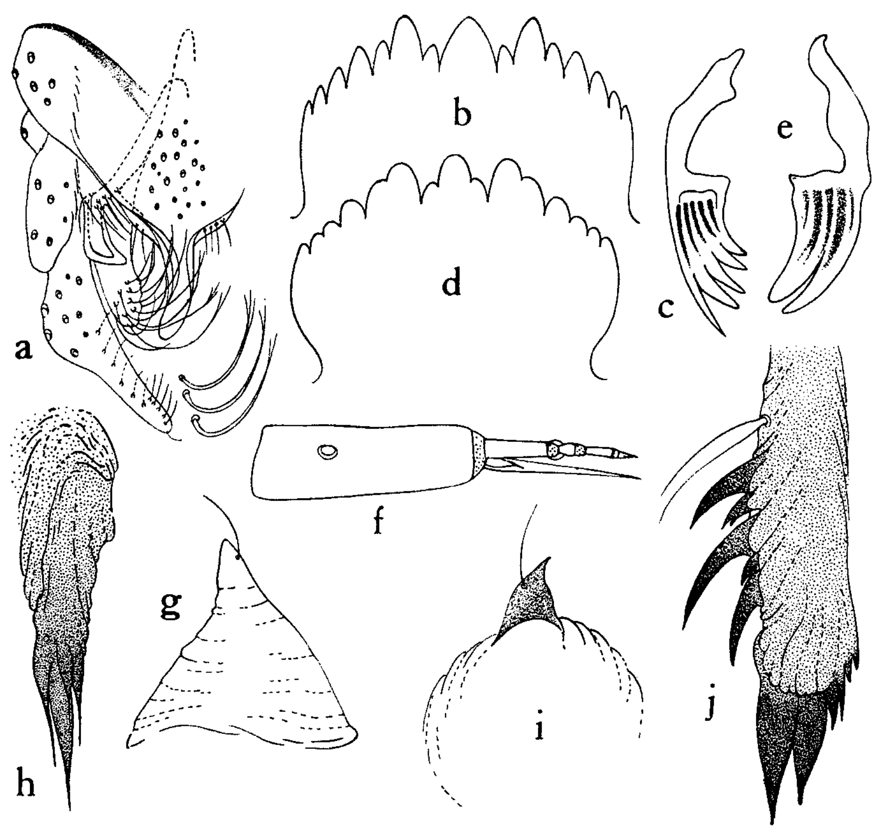


FIGURE 12.—*Chironomus* (s. str.). **a,** *C. samoensis,* male hypopygium. **b, c,** *C. longilobus,* larva: *b,* mentum; *c,* premandible. **d-h,** *C. crassiforceps: d,* mentum of larva; *e,* premandible of larva; *f,* antenna of larva; *g,* frontal tubercle of pupa; *h,* caudolateral spine of pupa. **i, j,** *C. claggi,* pupa: *i,* frontal tubercle; *j,* caudolateral spine.

PONAPE. COLONIA: Female, eight males, Agric. Expt. Sta., light trap, Jan. 1953, Gressitt; female, Agric. Expt. Sta., June-Sept. 1950, Adams; two females, three males, airfield, June-Sept. 1950, Adams; two females, Jan. 1953, Clarke; female, three males, Aug. 1946, Townes; female, male, near Colonia, Aug. 1946, Townes; female, Mt. Temwetemwensekir, 100 m., Jan. 1953, Gressitt.

KUSAIE. MUTUNLIK: Two females, 12 males, light trap, Jan., Feb., Mar. and Apr. 1953, Clarke; five females, 19 males, light trap, Jan. 1953, Gressitt; male, Mt. Buache, Aug. 1946, Townes; two males, Mt. Tafeayat, Aug. 1946, Townes.

CAROLINE ATOLLS. NUKUORO: Male, Nukuoro I., Aug. 1946, Townes. SATAWAN: Female, four males, Moch I., Nov. 1952, Beardsley. LOSAP: Male, Pis I., Oct. 1952, Beardsley.

MARSHALL IS. MAJURO: Female, Aug. 1946, Townes.

This species is very closely allied to *javanus*, from which it may be easily distinguished by the coloration of the tarsal segments and the characteristic relative lengths of the fore tarsal segments of the female.

53. Chironomus (Chironomus) sexipunctatus Tokunaga, n. sp.

Medium-sized yellow species; frontal tubercles large, female antenna mainly yellow, last segment and neck parts of preceding segments fuscus, scutum with six black oval spots on yellow vittae, legs mainly yellow and pale brownish, but tarsi almost uniformly fuscus.

Female: Body 5.72 mm. long; wings broken. General coloration yellow. Head entirely pale brown including mouthparts, with eyes separated above by about one-third length of eye; frontal tubercles coniform, large and as long as two facets combined; palp pale brown; antenna with scape and following four segments yellow, last segment and neck parts of preceding segments fuscus, neck parts of segments 3 to 5 as long as half of segments, last segments subequal to preceding two together, six-segmented (25: 60: 39: 40: 41: 80). Thorax mainly very pale yellow, scutum white, with vittae yellow and six distinct oval black spots: two on either lateral vitta and two on middle part of median vitta, postscutellum dark on middle part and yellow on caudal marginal area, scutellum with nine bristles along caudal margin and five small setae on anterior part. Legs with coxae, trochanters and femora yellow, tibiae pale brownish yellow, tarsal segments fuscus, but basal part of first segment paler, pulvilli large; fore legs missing. Wings broken, with basal parts and anterior veins brownish; halter very pale brown. Abdomen mainly yellow, posterior two segments and cerci pale brownish yellow.

Male: Unknown.

Holotype, female (US 66558), Dededo, Guam, water drum, July 8, 1938, Oakley.

DISTRIBUTION: S. Mariana Is. (Guam).

This species is highly specific in the six distinct black spots on the yellow vittae of the white scutum, which easily distinguish it from other species of the subgenus *Chironomus*.

54. Chironomus (Chironomus) sp. No. 1.

Rather large, white or pale yellow species, no dark or brown markings.

Female: Body about 2.73 mm. long; wings about 2.21 mm. by 0.57 mm. Frontal tubercles absent; antenna six-segmented (20: 44: 30: 31: 28: 39), neck parts of flagellar segments hardly as long as one-half of segments. Thorax entirely yellowish white. Legs very long, with pulvilli large, RL-FT about 112: 87. Wings with veins entirely very pale, fMCu just beyond r-m, RL-V 64: 51: 80: 71.

Male: Unknown.

DISTRIBUTION: Caroline Is.

PALAU. BABELTHUAP: Female, Ngaremlengui, light trap, June 1957, Sabrosky.

55. Chironomus (Chironomus) sp. No. 2.

Rather large, pale brownish-yellow species, similar to *carolinense* in general appearance, but distinctly different in the longer and almost uniformly brownish legs.

Female: Body about 5.2 mm. long; wings about 2.99 mm. by 0.74 mm. Head entirely pale brown, with hornlike frontal tubercles; antenna yellow basally, brown apically, fuscus on last segment, six-segmented (20: 57: 38: 42: 46: 82). Thorax almost entirely yellow, scutum white and with vittae yellow, scutellum with 10 bristles and 6 small setae. Legs yellow basally, distal one-third of femora, entire tibiae and basal tarsal segments uniformly brown, apical tarsal segments dark, LR 1.72, RL-FT 146: 106, RL-T 182: 97: 80: 82: 25. Wing with veins entirely brownish, fMCu under origin of r-m, RL-V 84: 75: 120: 90. Halter white. Abdomen entirely yellowish white.

Male: Unknown.

DISTRIBUTION: S. Mariana Is.

S. MARIANA IS. GUAM: Female, Mata, Nov. 1937, Oakley.

56. Chironomus sp. No. 3.

Rather large, yellowish-brown species, somewhat similar to *longilobus,* but scutal vittae entirely yellow and fore tibia entirely dark brown.

Female: Body 4.62 mm. long; wings 2.52 mm. by 0.77 mm. Head brown, with vestigial frontal tubercles; palp five-segmented (10: 10: 40: 45: 60); antenna fuscus brown, six-segmented (20: 38: 20: 22: 27: 60), neck parts about one-third of segments. Thorax with scutal vittae yellow, scutellum with 10 bristles. Legs mainly yellowish brown, fore leg with apex of femur and entire tibia dark brown, tarsus missing, mid and hind legs with basal third of tibiae brown and apical third of tarsal segments slightly fuscus; RL-FT 86: 60. Wing with veins entirely pale brown, fMCu just beyond r-m, RL-V 76: 58: 93: 86. Halter white. Abdomen mainly yellow, caudal segments yellowish brown.

Male: Unknown.

DISTRIBUTION: S. Mariana Is.

S. MARIANA IS. SAIPAN: Female, Rota I., May 1958, Krauss.

57. Chironomus (Chironomus) sp. No. 4.

Medium-sized white species similar to species No. 1, but wings broader, legs shorter and body smaller.

Female: Body 2.9 mm. long; wings 1.82 mm. by 0.58 mm. Head without frontal tubercles; palp five-segmented (12: 12: 41: 50: 77); antennae missing. Scutum with vittae pale yellow, scutellum with nine bristles and 10 small setae. Legs almost

entirely white, tibial tip of fore leg and two apical tarsal segments of mid and hind legs slightly fuscus or brown; RL-FT 62:45; fore tarsi missing. Wing with veins very pale, fMCu slightly beyond r-m, RL-V 50:32:71:55. Halter white. Abdomen entirely very pale brownish yellow.

Male: Unknown.

DISTRIBUTION: Caroline Is.

PALAU. BABELTHUAP: Female, Ulimang, Dec. 1947, Dybas.

Subgenus **Endochironomus** Kieffer

Endochironomus Kieffer, 1918, Mus. Nat. Hungarici, Ann. **16**:69; 1921, Soc. Sci. Bruxelles, Ann. **40**:273.—Goetghebuer, 1937, IN Lindner, Flieg. Palaearkt. Reg. **13**, c:9.

Chironomus subgenus *Endochironomus,* Edwards, 1929, Ent. Soc. London, Trans. **77**:393.—Freeman, 1957, British Mus. (N.H.) Ent. Bull. **5**(9): 351.

Demeijerea Kruseman, 1933, Tijdschr. Ent. **76**:154.—Goetghebuer, 1937, IN Lindner, Flieg. Palaearkt. Reg. **13**, c:11.

Tanytarsus subgenus *Endochironomus,* Townes, 1945, Am. Midland Naturalist **34**:64; 1952, Conn. State Geol. Nat. Hist. Surv. Bull. **80**:56.

Male antenna typically 14-segmented and sometimes 12-segmented, female, usually seven- and sometimes six-segmented; frontal tubercles present or absent; pronotum reaching to front edge of scutum, but usually bilobate and sometimes collarlike but without V-shaped emargination; fore tibial scale usually without apical spur, but sometimes sharply pointed, middle and hind combs united or completely fused with each other, each with a spur or one spur reduced and sometimes both spurs absent; wing vein R_{2+3} usually ending well beyond R_1.

KEY TO MICRONESIAN SPECIES OF ENDOCHIRONOMUS

All legs uniformly very pale, except for brownish fore coxae....................**58. palauensis**

Fore leg at least with brownish knee part....................**59. tenuicaudus**

58. Chironomus (Endochironomus) palauensis Tokunaga, n. sp.

Rather small, pale brownish-yellow species, female antenna six-segmented, no frontal tubercles, fore tibial scale round on apical margin, tibial combs confluent and without spurs.

Female: Body 2.73 mm. long; wings 1.85 mm. by 0.48 mm. Head entirely pale brown, with eyes separated above only by one-sixth length of eye or three facets together; palp five-segmented (15:18:62:46:70); antenna with scape brown, other segments pale brown, neck parts slender, six-segmented (17:34:29:30:28:29). Thorax broadly pale brown, scutum pale brown, with mid-dorsal stripe, shoulder parts, caudoscutal area, and caudolateral corners yellowish white, scutellum pale brownish yellow and with only 10 bristles. Legs almost entirely pale brownish yellow, but only fore coxa pale brown; fore tibial scale round on apical margin, middle and hind tibial combs quite confluent and spurs absent, pulvilli large, RL-FT 91:64; fore tarsi missing. Wing slender, anal lobe highly reduced, anal angle round, squama with

five to seven marginal setae, veins very pale brown, costa ending almost at wing tip, fMCu just beyond r-m, RL-V 55: 45: 74: 60. Halter very pale brown. Abdomen yellowish pale brown, first basal and caudal two to three segments more brownish, cercus yellowish brown.

Male: Unknown.

Holotype, female (US 66559), E. Ngatpang, Babelthuap I., Palau Is., 65 m., light trap, Dec. 9, 1952, Gressitt.

DISTRIBUTION: Caroline Is. (Palau).

This is similar to *C. tendens* Fabricius (Europe) and *C. avicula* Freeman (Africa) in general appearance, but differs in the six-segmented female antenna and absence of tibial spurs of the middle and hind tibial combs.

59. Chironomus (Endochironomus) tenuicaudus Tokunaga, n. sp. (fig. 13, *c*).

Rather small species, male brown and yellowish pale brown, female dark brown and yellowish pale brown in general appearance. Male antenna 14-segmented; female antenna 6-segmented. No frontal tubercles; fore tibial scale without apical sharp projection or spine, middle and hind tibial combs quite confluent and without spurs; AR about 1.3.

Male: Body about 2.86 mm. long; wing about 1.52 mm. by 0.39 mm. Head pale brown, no frontal tubercles; palp five-segmented (11: 16: 30: 34: 38); antenna entirely brown, 14-segmented, AR 1.29-1.31. Thorax extensively yellow, but scutum brown, with caudoscutal area broadly yellowish brown and with middorsal pale stripe and rather indistinct pale humeral lateral stripes along foveae, postscutellum brown and only yellowish along anterior margin, scutellum yellowish brown and with 10 bristles along caudal margin. Legs mainly white, coxae and three apical tarsal segments pale brownish yellow, but fore leg broadly pale brown on knee part and apex of tibia; no spine on fore tibial scale and spurs of mid and hind combs completely fused with each other, pulvilli distinct, RL-FT 64: 48, fore tarsi missing. Wing very pale brown, slender, squama with two to three marginal setae, costa ending just before wing tip, fMCu just beyond r-m, RL-V 47: 35: 58: 53. Halter yellowish brown. Abdomen yellowish brown, but lateral sides of basal segment more brownish; male hypopygium (fig. 13, *c*) fuscus pale brown, with anal point dark and very long, style tapered only at tip, dorsal appendage oval, with only four to five small setae and without caudal projection, ventral appendage very slender, long, with only three strong bristles.

Female: Body 1.83 mm. long; wing 2.0 mm. by 0.55 mm. General appearance far darker than in male, head and mouthparts brown, antennae dark brown, thorax extensively dark brown, legs distinctly brown and yellow, abdomen slightly fuscus brown. Palp five-segmented (about 12: 14: 67: 49: 85); antenna six-segmented (17: 42: 32: 32: 29: 36), neck parts of segments 2 to 5 long. Scutum with humeral areas, caudolateral corners, mid-dorsal and laterodorsal stripes pale brown, sternum yellowish brown, scutellum pale brown and with 12 bristles. Legs mainly yellowish pale brown, fore leg with coxa, trochanter, apical half of femur, and entire length of tibia brown, other legs with basal two-thirds of tibiae and two apical tarsal segments brown; RL-FT 100: 73; fore tarsi missing. Wing with membrane fumose, anal lobe slightly developed, with angle round, squama with six to seven marginal setae, veins pale brown, costa ending almost at wing tip, RL-V 59: 46: 79: 66. Halter dark brown. Abdomen fuscus pale brown, lateral sides of basal segments and caudal segments darker, cercus yellowish pale brown.

Holotype, male (US 66560), Dugor, Yap Is., June 1, 1957, Sabrosky. Allotype, female (US), Kolonia, Yap Is., Apr. 11, 1954, Beardsley.

DISTRIBUTION: Caroline Is. (Yap).

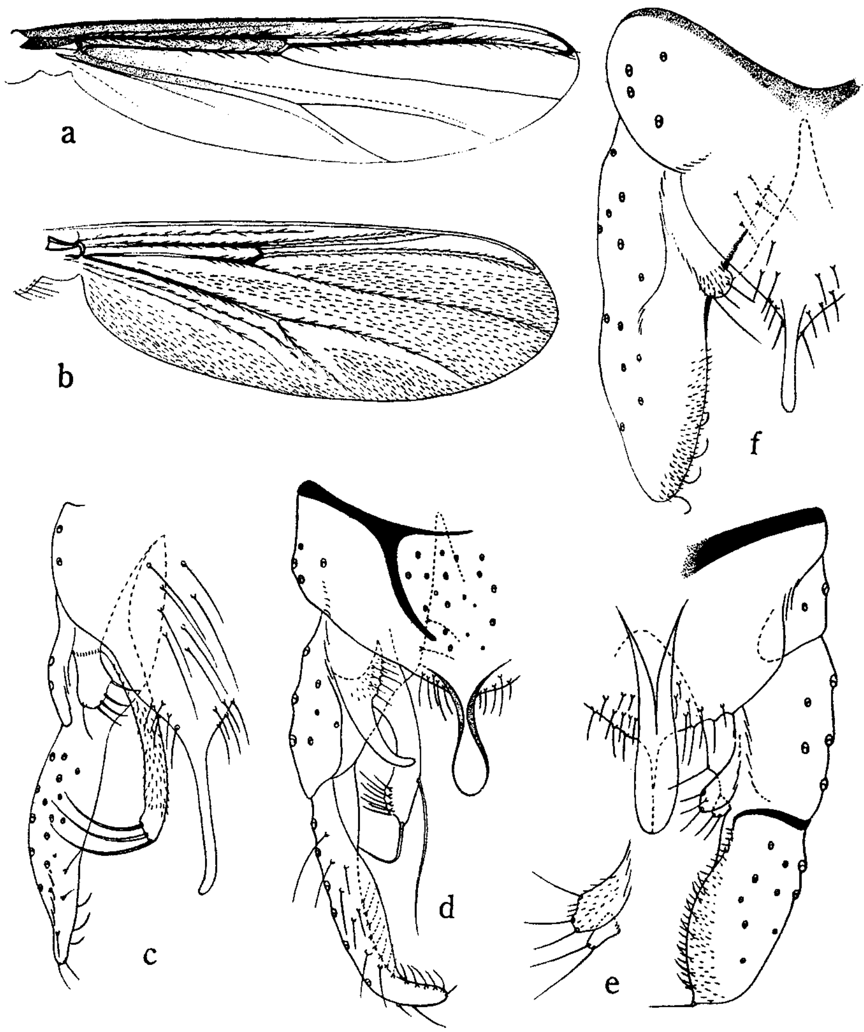


FIGURE 13.—**a, b,** female wings: *a, Stenochironomus sabroskyi; b, Phaenopsectra gressitti.* **c-f,** male hypopygia: *c, Chironomus (Endochironomus) tenuicaudus; d, Phaenopsectra gressitti; e, Chironomus (Cryptochironomus) javae; f, C. (Cr.) ponapensis.*

The female of this species is close to *townesi,* but differs in the absence of the subbasal yellow bands of the mid and hind tibiae, the round fore tibial scale and the non-spurred tibial combs. The male is specific in the structure of the ventral appendage of the hypopygium. The hypopygium seems to be similar to those of *Stictochironomus* rather than *Endochironomus,* being provided with the slender anal point, the long styles and the very slender and long ventral appendages and the reduced dorsal appendages, but the spurs of the middle and hind tibial combs are completely absent, distinctly differing from *Stictochironomus.*

Subgenus **Cryptochironomus** Kieffer

Cryptochironomus Kieffer, 1918, Ent. Mitt. **7**: 46; 1923, Soc. Ent. France, Ann. **92**: 153.—Townes, 1945, Am. Midland Naturalist **34**: 96.

Nilomyia Kieffer, 1921, Soc. Sci. Bruxelles, Ann. **40**: 270; 1921, Soc. Ent. France, Ann. **90**: 27.

Gillotia Kieffer, 1921, Soc. Sci. Bruxelles, Ann. **40**: 279; 1921, Soc. Ent. France, Ann. **90**: 31.

Kribiocryptus Kieffer, 1921, Soc. Sci. Bruxelles, Ann. **40**: 270; 1921, Soc. Ent. France, Ann. **90**: 28.

Cladopelma Kieffer, 1921, Soc. Sci. Bruxelles, Ann. **40**: 274; 1921, Soc. Ent. France, Ann. **90**: 31; 1922, Ibid. **91**: 50.

Harnischia Kieffer, 1921, Soc. Hist. Nat. Moselle, Bull. **29**: 69.—Townes, 1949, Am. Midland Naturalist **34**: 147.

Parachironomus Lenz, 1921, Deutsche Ent. Zeitschr. **1921**: 160.

Paracladopelma Harnisch, 1923, Zool. Jahrb. Syst. **47**: 304.

Chironomus subgenus *Chironomus,* Groups D and E, Edwards, 1929, Ent. Soc. London, Trans. **77**: 387.

Leptochironomus Pagast, 1931, Folia Zool. Hydrobiol. Riga **3**: 208, 210, 216.

Tendipes subgenus *Cryptochironomus,* Goetghebuer, 1937, IN Lindner, Flieg. Palaearkt. Reg. **13**, c: 34.

Dychironomus Lenz, 1941, Zool. Anzeiger **133**: 35.

Paraharnischia Lenz, 1941, Ibid. **133**: 36.

Cryptocladopelma Lenz, 1941, Ibid. **133**: 37.

Chironomus subgenus *Cryptochironomus,* Freeman, 1957, British Mus. (N.H.) Ent. Bull. **5**: 382.

Subgeneric characters mainly as in *Chironomus* (sens. str.), but frontal tubercles always vestigial or absent and male hypopygium with dorsal appendage variably reduced, rarely well-formed and ventral appendage greatly reduced, almost absent.

Key to Micronesian Species of Cryptochironomus

AR 2.15-2.49; fore femur at least fuscus apically; male hypopygium with broad anal point..**60. javae**

AR 1.23-1.38; fore femur entirely pale; male hypopygium with slender anal point ....**61. ponapensis**

60. Chironomus (Cryptochironomus) javae (Kieffer). (Figure 13, *e*.)

Cryptochironomus javae Kieffer, 1924, Soc. Sci. Bruxelles, Ann. **43**: 264. —Johannsen, 1932, Archiv Hydrobiol., Suppl. 9, Tropische Binnengewässer **3**: 529.

Large yellow species with coloration of legs somewhat variable sexually and individually. Head with frontal tubercles minute, AR 2.15-2.49, female antenna six-segmented; LR 1.9. Thorax mainly yellow, four scutal vittae yellow or yellowish pale brown on yellowish-white ground color, postscutellum brown but yellow anteriorly; legs of paler specimens almost entirely yellow, with apical two to three tarsal segments of all legs, apical half of fore femur, and entire length of fore tibia yellowish brown, in dark specimens fore leg with coxa and trochanter pale brownish yellow, femur and tibia dark brown, mid and hind leg with four basal segments entirely yellow or femur only brown at tip, all legs with basitarsus mainly yellow and only brown at tip, segments 2 to 3 mainly brown and with tips dark, last two segments entirely dark; abdomen yellowish basally, gradually becoming brown posteriorly, no spots or bands.

Male: Body about 4.1 mm. long; wings 1.9 (1.78-2.05) mm. by 0.53 (0.51-0.57) mm. Head almost entirely yellow, with frontal tubercles very minute, eyes separated above by one-sixth length of eye; palp five-segmented (12.4: 16.4: 44: 39: 51.8); antenna with scape fuscus yellow, flagellum brown, plumose hairs yellow, 12-segmented, AR 2.34 (2.15-2.49). Thorax yellow, scutum yellowish white, with four yellow vittae, but sometimes anterior parts of middle and caudal parts of lateral vittae brown, postscutellum brown, but yellow along anterior margin, scutellum with eight bristles and two to seven small setae. Legs mainly yellow, but at least fore leg with femoral tip, entire length of tibia and all legs with last three tarsal segments brown or dark brown; LR 1.92 (1.91-1.93), RL-FT 70.6: 46, pulvilli large. Wing entirely pale including veins, squama with four to seven marginal setae, fMCu just beyond origin of r-m, RL-V 60.5: 37.5: 75: 70. Halter white or yellowish white. Abdomen yellowish anteriorly and gradually brown posteriorly, without spots or bands; hypopygium (fig. 13, *e*) brown, with anal point large, rather broad and not pointed, style very large, elongate oval, with single small apical seta, setigerous and pubescent on mesal side, both appendages vestigial, dorsal one with three and ventral one with two apical setae.

Female: Body 3.06 (2.86-3.25) mm. long; wings 1.96 (1.95-1.98) mm. by 0.65 (0.64-0.66) mm. Coloration and structures as in male with usual sexual differences. Head with palp five-segmented (14: 16: 48: 42.7: 61.7); antenna six-segmented (18: 34.3: 22.3: 23.3: 26.3: 37) with scape yellowish, other segments pale brownish, but last segment somewhat fuscus, intermediate flagellar segments elongate fusiform, with neck parts about one-third of segments. RL-FT 70: 49.3. Wing with veins pale brown, fMCu under or just beyond r-m, RL-V 56: 36.5: 79: 61.

DISTRIBUTION: Java, Caroline Is.

PALAU. Koror: Four males, light trap, Dec. 1952, Gressitt; female, male, July 1956, McDaniel. Babelthuap: female, male, Ngerehelong Pen., light trap, May 1957, Sabrosky.

YAP. YAP: Male, Kolonia, light trap, June 1957, Sabrosky; four females, hill behind Yaptown, 65 m., Dec. 1952, Gressitt.

61. Chironomus (Cryptochironomus) ponapensis Tokunaga, n. sp. (fig. 13, *f*).

Medium-sized yellow species, only fore tibia and three to four distal tarsal segments more or less fuscus. Head without frontal tubercles, eyes narrowly separated, AR 1.23-1.38, legs with pulvilli large, wing with fMCu far beyond r-m.

Male: Body 2.73-2.99 mm. long; wings 1.51-1.55 mm. by 0.4-0.46 mm. Almost entirely yellow; head yellowish pale brown, with mouthparts very pale. No frontal tubercles, eyes separated above by width of 3.5 facets; palp five-segmented (9: 9: 35: 38: 40); antenna with scape yellow, flagellum brown and thick, AR 1.23-1.38. Thorax almost entirely pale yellow, scutum with vittae yellow on white ground color, scutellum with seven to eight bristles and two to four small setae. Legs almost entirely yellow, but fore tibia and all last tarsal segments fuscus and penultimate two to three tarsal segments of all legs very slightly brownish, RL-FT 63: 43, pulvilli large. Wing with veins very pale brown, squama with three to five marginal setae, fMCu far beyond r-m and under basal one-fourth of R_1, RL-V about 42: 29: 56.5: 50.5. Halter almost white. Abdomen entirely yellow, without spots and bands. Hypopygium (fig. 13, *f*) pale brownish yellow, with anal point slender, style very stout, not constricted at basal articulation, with several small setae on apical half of mesal side, dorsal appendage rudimentary, semicircular, with three apical setae, ventral appendage absent.

Female: Unknown.

Holotype, male (US 66561), near Colonia, Ponape, Aug. 3, 1946, Townes. Paratypes, two males (BISHOP), Mt. Temwetemwensekir, 180 m., light trap, Ponape, Jan. 19, 1953, Gressitt; male, Ponape, Mar. 23, 1948, Dybas.

DISTRIBUTION: Caroline Is. (Ponape).

This species is allied to *javae,* from which it may be distinguished by the characteristic structure of the male hypopygium and the general paler appearance. *C. subovatus* Freeman (Africa) is also similar to the present new species, but the style is broader, somewhat oval, not tapered and distinctly articulated with the coxite, and the eyes are separated above by more than their terminal width. Other allied species may be *C. distractus* Johannsen (Java) and *C. viridiclava* Kieffer (Formosa), but the Micronesian species distinctly differs from the former by the more slender anal point and the stout style and from the latter by the small AR.

Genus **Stenochironomus** Kieffer

Stenochironomus Kieffer, 1919, Ent. Mitt. **8**: 44; 1922, Soc. Ent. France, Ann. **91**: 56.—Goetghebuer, 1936, Rev. Zool. Bot. Afr. **28**: 459; 1937, IN Lindner, Flieg. Palaearkt. Reg. **13**, c: 12.—Townes, 1945, Am. Midland Naturalist **34**: 84.—Freeman, 1957, British Mus. (N.H.) Ent. Bull. **5**: 409.

Chironomus subgenus *Stenochironomus,* Goetghebuer, 1928, Faune France **18**: 35.—Edwards, 1929, Ent. Soc. Lond., Trans. **77**: 395.

Palp normal; antennae of male with 14 segments, of female with six; frontal

tubercles absent. Pronotum much reduced, very narrow on mid-dorsal part, far surpassed by the strongly projecting anterior part of scutum (cone) over head. Squama of wing fringed, wing without macrotrichia, R_{2+3} close to R_1 at apex. Scale of fore tibia round at apex and rarely with short apical spur, combs of mid and hind tibiae fused, each with single spur, rarely inner spur reduced or absent. Male hypopygium characteristic, with anal point usually erect and bent at apex, dorsal appendage small and with several setae, ventral appendage elongate, curved, with few apical bristles and single articulated spine at extreme tip, style long and with long hairs on apicomesal margin.

62. **Stenochironomus sabroskyi** Tokunaga, n. sp. (fig. 13, *a*).

Rather small species with distintinctive coloration. Thorax white and black, scutellum and postscutellum black; legs mainly yellowish white with dark broad bands, all knee parts and subbasal part of fore femur dark; wing mainly very pale brown, but anterior veins before r-m and their adjacent membranes distinctly fuscus; halter with basal part of stem white and knob and apical half of stem black. No frontal tubercles; female antenna six-segmented; wing veins R, R_1, R_{4+5} and apical half of M strongly setigerous.

Female: Body 3.45 mm. long; wings 2.34 mm. by 0.61 mm. Head pale brown, with mouthparts brown, eyes narrowly separated above by one-fifth of length of eye; palp brown, five-segmented (15: 25: 60: 55: 90); antenna almost entirely white, six-segmented (20: 40: 33: 34: 29: 45.5). Thorax mainly white, but scutellum and postscutellum entirely black; scutellum with 11 bristles along caudal margin and seven small setae on anterior part. Legs mainly yellowish white, but in fore leg, femur with broad subbasal dark band and black apex, tibia black on basal half and faintly fuscus at apical tip, fore tarsus missing, in mid and hind leg, knee parts very widely black; pulvilli large, fore tibial scale round, tibial combs confluent and with one spur (in mid leg) or two spurs (in hind leg), RL-FT 122: 90. Wing (fig. 13, *a*) very pale brown, but basal half of costal area including veins fuscus, radial veins and apical half of M strongly setigerous, r-m and fR pale, fMCu under origin of r-m, R_{2+3} indistinct, RL-V 67: 55: 94: 74. Halter dark, but basal part of stem white.

Male: Unknown.

Holotype, female (US 66562), Ngiwal, Babelthuap I., Palau, light trap, May 31, 1957, Sabrosky.

DISTRIBUTION: Caroline Is. (Palau).

Although the male of this species is not yet known, the female has distinctive coloration which differs greatly from the other species. This species is somewhat allied to *S. atroconus* Freeman (Africa), but the coloration of the thorax and legs is quite different from *atroconus* and other allied species. The wings of the present species are very similar to those of *albicoxa* Freeman (Africa) the wing of which is shown in the fine photograph.

Genus **Stictochironomus** Kieffer

Stictochironomus Kieffer, 1919, Ent. Mitt. **8**: 44.—Goetghebuer, 1928, Faune France **18**: 18; 1937, IN Lindner, Flieg. Palaearkt. Reg. **13**, c: 55.—Freeman, 1958, British Mus. (N.H.) Ent. Bull. **6** (11): 304.

Kribiocallis Kieffer, 1921, Soc. Sci. Bruxelles, Ann. **40**(1): 271.—Kieffer, 1922, Soc. Ent. France, Ann. **91**: 16.

Chironomus subgenus *Stictochironomus,* Edwards, 1929, Ent. Soc. London, Trans. **77**: 400.

Tanytarsus subgenus *Stictochironomus,* Townes, 1945, Am. Midland Naturalist **34**: *77*; 1952, Conn. State Geol. Nat. Hist. Surv. Bull. **80**: 61.

Male antennae 14-segmented and female six-segmented; frontal tubercles absent. Pronotum reduced but not completely. Fore tibia usually with oval scale, but sometimes pointed apically; combs of mid and hind tibiae fused completely and with single spur on each pair; pulvilli rather small and not split. Wing membrane without macrotrichia, squama fringed with setae, R_{2+3} distinct and ending well beyond tip of R_1. Male hypopygium with well-developed dorsal and ventral appendages, style often narrow, abdominal tergite 8 not contracted basally.

63. **Stictochironomus townesi** Tokunaga, n. sp.

Medium-sized brown and yellow species with thorax extensively brown, legs brown and yellow, female antenna six-segmented, no frontal tubercles, fore tibial scale sharply pointed apically, combs of mid and hind tibiae quite confluent and with single short spurs.

Female: Body 3.32 mm. long; wings 1.99 mm. by 0.55 mm. Head with vertex brown, mouthparts pale brownish yellow, eyes separated above by one-seventh length of eye; palp five-segmented (13: 21: 58: 40: 65); antenna with scape yellowish brown, flagellum with neck parts and last segment brown, bulb parts pale brown, six-segmented (19: 22 + 30: 30: 25: 24: 28), segment 2 deeply constricted before middle. Thorax broadly brown, scutum with mid-dorsal stripe yellow, humeral parts pale brown, caudolateral corners yellow, scutellum pale brown, postscutellum pale brown on anterior part and yellow on posterior two-thirds, sternum yellow; scutellum with 10 bristles only. Legs brown and yellow, all tarsi missing; in fore leg, coxa brown, trochanters and basal two-thirds of femora yellow, apical one-third of femora pale brown, tibia entirely brown; in mid and hind legs, coxa, trochanters and femora yellow, tibiae with base and preapical half pale brown or brown, basal one-third and apex yellow; fore tibial scale with apical spine, combs of mid and hind tibiae confluent and each with single short spur; RL-FT 90: 68. Wing slender, entirely slightly fumose, squama with five to six marginal setae, anal lobe round and obtuse, veins pale brown, costa ending at wing tip, fMCu just beyond r-m, RL-V 60: 43: 78: 65. Halter with stem brown and knob white. Abdomen mainly pale brownish yellow, tergite 1 brown, cercus pale brownish yellow.

Male: Unknown.

Holotype, female (US 66563), Lele I., Kusaie, Aug. 21, 1946, Townes.

DISTRIBUTION: Caroline Is. (Kusaie).

The present species is somewhat allied to *histrio* Fabricius (Europe), which is rather variable in coloration but always provided with a single fuscus cloud covering r-m. *S. townesi* differs in that the wing is uniformly slightly fumose and devoid of the central fuscus cloud.

Genus **Phaenopsectra** Kieffer

Phaenopsectra Kieffer, 1921, Soc. Hist. Nat. Bruxelles, Ann. **40**: 274.—Goetghebuer, 1937, IN Lindner, Flieg. Palaearkt. Reg. 13, c: 80.

Pentapedilum subgenus *Phaenopsectra,* Goetghebuer, 1928, Faune France **18**: 103.—Edwards, 1929, Ent. Soc. London, Trans. **77**: 375.

Antennae of male 14-segmented and of female usually seven- or sometimes six-segmented. Pronotum more or less reduced. Fore tibial scale without apical spine; combs of other tibiae confluent, usually each with a spur but always one spur short and almost absent especially in middle leg; pulvilli large. Wing with dense macrotrichia, r-m oblique. Male hypopygium with dorsal and ventral appendages well developed, ventral appendage with two long apical bristles.

64. **Phaenopsectra gressitti** Tokunaga, n. sp. (fig. 13, *b, d*).

Medium-sized species, male dark brown and yellow, female brown and yellow, both sexes with abdomen yellow anteriorly and dark posteriorly, scutum with four vittae distinct in female and rather ill-defined in male. Head with frontal tubercles vestigial, male antenna 14-segmented, AR 0.6-0.7, female antenna six-segmented; leg with fore tibial scale round on apical margin, middle and hind tibial combs just confluent, with single spur on mid leg and two unequal spurs on hind leg, LR 1.31-1.41; wing with macrotrichia spread almost all over surface, squama with fringe of setae.

Male: Body about 3.25 mm. long; wing 1.56 (1.48-1.64) mm. by 0.46 (0.44-0.49) mm. Head entirely brown, with frontal tubercles vestigial; antenna basally brown, apical half yellowish, 14-segmented, AR 0.6-0.7. Thorax extensively fuscus brown, scutum with four black vittae, with mid-dorsal stripe and areas along foveae pale, postscutellum black, scutellum with usually eight bristles along caudal margin and seven to eight small setae on anterior part. Legs mainly yellow, all coxae brown, apical ends of femora, basal half of tibiae and last tarsal segments pale brownish; combs of tibia subconfluent, middle combs with single long spur, hind with two unequal spurs, LR 1.39 (1.36-1.41), RL-FT 57.8: 45:8. Wing with anterior veins very pale yellow, macrotrichia spread almost all over surface, but bare areas along veins broad, vein M setigerous only at tip, squama with four to six marginal setae, fMCu slightly beyond r-m, RL-V 45: 37.7: 70.1: 51.9. Halter white. Abdomen yellow on basal four segments and gradually darkened toward caudad; hypopygium (fig. 13, *d*) dark brown, anal point rather slender, more or less oval apically, style slender uniformly, dorsal appendage setigerous basally, bare projection long, only slightly curved, tapered, but not sharply pointed.

Female: Body 2.64 (1.95-3.25) mm. long; wings 1.7 (1.42-1.87) mm. by 0.56 (0.52-0.62) mm. Thorax mainly yellow and with four scutal vittae brown and separated, differing from male. Head brown and mouthparts yellow, eyes bare and very narrowly separated above; palp with five segments in RL of 14.7: 14: 46.3: 51: 96; antenna with scape reddish brown, other segments yellowish brown, six-segmented (15: 36.3: 21.3: 20.5: 20: 31), neck parts short and indistinct. Thorax with four scutal vittae and caudoscutal area brown, postscutellum dark brown, scutellum with 10 to 14 bristles and 10 to 11 small setae. Legs with coxae yellowish pale brown, trochanters and femora yellow, femoral tips brown, fore tarsus entirely brown, middle and hind tarsi mainly yellowish pale brown, but basal half of basitarsi and entire length of last segments brown; LR 1.34 (1.31-1.37), RL-FT 63.9: 51.7. Wing (fig. 13, *b*) with macrotrichia dense, squama with about 15 marginal setae, RL-V 42.9: 33.1: 60.8: 48.9. Abdomen yellow basally, dark brown on caudal four to five segments, cercus yellowish brown.

Holotype, male (BISHOP 3374), Mutunlik (Yepan), Kusaie, 16 m., light trap, Jan. 29, 1953, Gressitt. Allotype, female (BISHOP), same data as for holotype, Jan. 23, 1953. Paratypes, Kusaie I.: two females, same data as for holotype; one male, same data for allotype; three female, five males, Mutunlik, light trap, Jan. 24, 1953, Gressitt; female, Mutunlik, Apr. 21, 1953, Clarke; male, Mwot, light trap, Apr. 10, 1953, Clarke; male, Pukusrik, Feb. 13, 1953, Clarke; Yap Is.: male, female, Tomil Distr., Yap I., Aug. 8, 1950, Goss; S.

Mariana Is.: Female, Pt. Oca, Guam I., May 1945, Bohart and Gressitt; Marshall Is.: Male, Ine I., Arno Atoll, June 22, 1950, La Rivers.

Other specimens: S. Marianas: Female, Pt. Oca, Guam, May 1945, Bohart and Gressitt.

Kusaie: 94 females, 28 males, Mutunlik, Jan.-Apr. 1953, Clarke; 30 females, 23 males, Mutunlik, light trap, Jan. 1953, Gressitt; two females, four males, Pukusrik, Feb.-Apr. 1953, Clarke; two females, Mutunlik, Jan. 1953, Gressitt; female, three males, Mwot, at light, Apr. 1953, Clarke; female, Mt. Fuinkol (100 m.), light trap, Jan. 1953, Gressitt. Yap: Six females, male, Tomil Distr., Yap, July 1950, Goss.

DISTRIBUTION: S. Mariana Is. (Guam), Caroline Is. (Kusaie, Yap), Marshall Is. (Arno).

This species is closely allied to the widely distributed *P. flavipes* (Meigen), from which it may be easily separated by the different value of the AR and LR (in *flavipes* AR 1.25, LR 1.25) and the bicolored abdomen.

Genus **Polypedilum** Kieffer

Polypedilum Kieffer, 1913, Soc. Hist. Nat. Metz, Bull. **28**: 15.—Goetghebuer, 1928, Faune France **18**: 87; 1937, IN Lindner, Flieg. Palaearkt. Reg. **13**, c: 56.

Pentapedilum Kieffer, 1913, Soc. Hist. Nat. Metz, Bull. **28**: 25.—Goetghebuer, 1928, Faune France, **18**: 99; 1937, IN Lindner, Flieg. Palaearkt. Reg. **13**, c: 77.

Pentapelma Kieffer, 1921, Soc. Sci. Bruxelles, Ann. **41**: 98.

Chironomus subgenus *Polypedilum,* Edwards, 1929, Ent. Soc. London, Trans. **77**: 401.

Pentapedilum subgenus *Pentapedilum,* Edwards, 1929, Ent. Soc. London, Trans. **77**: 376.

Antennae of male 14-segmented, of female six-segmented; frontal tubercles only rarely present. Pronotum moderately developed, usually not visible from above; scutum without central hump or tubercle. Fore tibial scale either triangular and sharply pointed or else oval and rarely without apical spur; middle and hind tibial combs separated, and rarely confluent, outer comb of posterior tibia and posterior comb of middle tibia each with single long spur, other comb of each tibiae large, and usually simple but rarely with small spur in middle leg; pulvilli each split into two narrow lobes. Wing with or without macrotrichia of membrane and either unmarked or with dark clouds and spots; squama with setae of fringe; R_{2+3} ending not far beyond tip of R_1. Male hypopygium with abdominal segment 8 constricted basally so as to appear triangular; anal point well-developed, ventral appendage usually with single long seta at tip.

Key to Subgenera of Polypedilum

Macrotrichia present on wing membrane at least at apex of cell R_5; wings without dark markings........**Pentapedilum**
Macrotrichia entirely absent from wing membrane; wings frequently with conspicuous dark markings........**Polypedilum**

Subgenus **Polypedilum** Kieffer

Polypedilum Kieffer, 1913, Soc. Hist. Nat. Metz, Bull. **28**: 15; 1913, Voy. Alluaud et Jeannel Afr. Orient. Ins. Dipt. **1**: 21; 1918, Mus. Nat. Hungarici, Ann. **16**: 65; 1921, Soc. Sci. Bruxelles, Ann. **41**: 97 (in part); 1922, Soc. Ent. France, Ann. **91**: 19; 1925, Soc. Roy. Ent. Egypt, Bull. **1924**: 265.—Goetghebuer, 1936, Rev. Zool. Bot. Afr. **28**: 480; 1937, IN Lindner, Flieg. Palaearkt. Reg. **13**, c: 56.—Townes, 1945, Am. Midland Naturalist **34**: 36.—Freeman, 1958, Brit. Mus. (N.H.) Ent. Bull. **6**: 267.

Paratendipes Kieffer, 1913, Voy. Alluaud et Jeannel Afr. Orient. Ins. Dipt. **1**: 24.

Tripedilum Kieffer, 1921, Soc. Sci. Bruxelles, Ann. **40**: 271; 1921, Soc. Ent. France, Ann. **90**: 28 and 47.

Kribiomimus Kieffer, 1921, Soc. Sci. Bruxelles, Ann. **40**: 271; 1921, Soc. Ent. France, Ann. **90**: 29; 1922, Ibid. **91**: 7.

Kribiotima Kieffer, 1921, Soc. Sci. Bruxelles, Ann. **40**: 274.

Pentapelma Kieffer, 1921, Ibid. **41**: 98.

Kribiophilus Kieffer, 1921, Soc. Ent. France, Ann. **90**: 30; 1922, Ibid., **91**: 43; Kieffer, 1921, Soc. Sci. Bruxelles, Ann. **41**: 98.

Kribiocharis Kieffer, 1922, Soc. Ent. France, Ann. **91**: 1.

Microtendipes Kieffer, 1922, Ibid. **91**: 8 (not Kieffer, 1915).

Chironomus subgenus *Polypedilum,* Edwards, 1929, Ent. Soc. London, Trans. **77**: 401.

Polypedilum subgenus *Tripodura* Townes, 1945, Am. Midland Naturalist **34**: 36.

Key to Micronesian Species of Subgenus Polypedilum

1.	Wing with fuscus markings or clouds	2
	Wing without fuscus markings or clouds	4
2(1).	Wing with two pale fuscus clouds in cell R_5	**65. concomitatus**
	Wing with three pale fuscus clouds in cell R_5	3
3(2).	Apical fuscus cloud of cell R_5 not separated from apical wing margin, basal fuscus cloud of cell M_2 just beyond cross vein r-m	**66. albiceps**
	Apical fuscus cloud of cell R_5 far separated from apical wing margin, basal fuscus cloud of cell M_2 before cross vein r-m	**67. perturbans**
4(1).	Tibia of mid leg with two equally developed spurs	5
	Tibia of mid leg with one long spur	6

5(4). Male with AR larger than 1.0; LR about 1.9 .... 69. **insulanus**
Male with AR smaller than 1.0; LR about 1.7 .... 68. **ponapensis**
6(4). Tibial scale of fore leg with apical spur or spine 7
Tibial scale of fore leg without apical spur or spine 10
7(6). Legs almost uniformly pale or yellowish .... 71. **medivittatus**
Legs mainly brown or bicolored 8
8(7). Legs uniformly dark brown .... 70. **dybasi**
Legs distinctly bicolored 9
9(8). Fore tibia entirely dark brown, mid and hind femora entirely pale or yellow .... 72. **nigribasalis**
Fore tibia mainly yellow, narrowly brown at apex, mid and hind femora with apical and preapical brownish bands .... 73. **longilobatus**
10(6). Body almost entirely brown .... 74. **spadix**
Body almost entirely yellow or white 11
11(10). Male with AR about 1.0; scutellum without accessory minute hairs .... 76. **yapensis**
Male with AR far larger than 1.0; scutellum with accessory minute hairs .... 75. **albicorpus**

65. Polypedilum (Polypedilum) concomitatus (Johannsen). (Figure 14, *a, d.*)

Chironomus (*Polypedilum*) *concomitatus* Johannsen, 1932, Archiv Hydrobiol. Suppl. 11, Tropische Binnengewässer 3: 517.

Small yellowish brown species, femora brown on basal half and yellowish white on apical half, wings with three faint gray or fuscus spots. AR about 1.12; LR about 2.2-2.3.

Male: Body about 2.0-2.2 mm. long; wing about 1.25-1.26 mm. by 0.36-0.38 mm. Head brown, mouthparts pale brown; no frontal tubercles. Antennae entirely brown, AR 1.12. Thorax mainly brown, scutum with three vittae subconfluent, not distinct, darker, scutellum yellowish, with five to six setae along caudal margin and two to three median accessory small setae. Legs mainly pale yellow, but coxae and basal half of all femora brown. Wing with four squamal setae, fMCu just or slightly beyond r-m, RL-V about 37: 26: 49: 44.5. Halter with knob pale brown, stem yellow. Abdomen entirely pale brown. Hypopygium (fig. 14, *d*) with anal point slender, style slender, dorsal appendage broad, entirely pubescent, with one or two long and several small setae, ventral appendage not extending beyond anal point, with single very long and 10 to 12 strong bristles on apical quarter.

Female: Body length about 1.29-1.76 mm; wings about 1.09-1.34 mm. by 0.35-0.43 mm. General coloration and structures similar to those of male with usual sexual differences. Palp with RL of five segments about 8.7: 9.7: 26: 30.7: 41. Antenna mainly pale brown, but last segment more brownish, five-segmented, but last segment deeply constricted, RL of segments about 14.3: 28: 18.8: 20.3: 13+34.7. Legs with coxae, trochanters, basal half or two-thirds of femora brown, other distal parts entirely yellowish white, tibial combs separated; LR 2.22-2.30. Wing (fig. 14, *a*) with darker spots than in male, squama with two to four marginal setae; RL-V about 32: 25: 48.5: 39.5. Abdomen with cerci pale yellow.

DISTRIBUTION: Java, Caroline Is.

PALAU. BABELTHUAP: Two females, three males, Ngaremlengui, at light, Apr. 1957, Sabrosky; two males, same data, June 1957, Sabrosky; three females, Ngiwal, at light, May 1957, Sabrosky; three females, male, Melekeiok,

at light, May 1957, Sabrosky; male, Ngaremeskang, light trap, Dec. 1952, Gressitt; female, Netkeng, Imeliik, Aug. 1957, Sabrosky. KOROR: Female, Koror, July 1956, McDaniel; 15 females, male, SW. Koror, light trap, Dec. 1952, Gressitt; female, Koror, Apr. 1957, Sabrosky. ULEBSEHEL: Three females, SE. Ulebsehel I., July 1956, McDaniel.

As Johannsen's original description, based on a single male and female (their fore tarsi and female antennae are missing), is insufficient for modern systematics, I have redescribed the species more completely here.

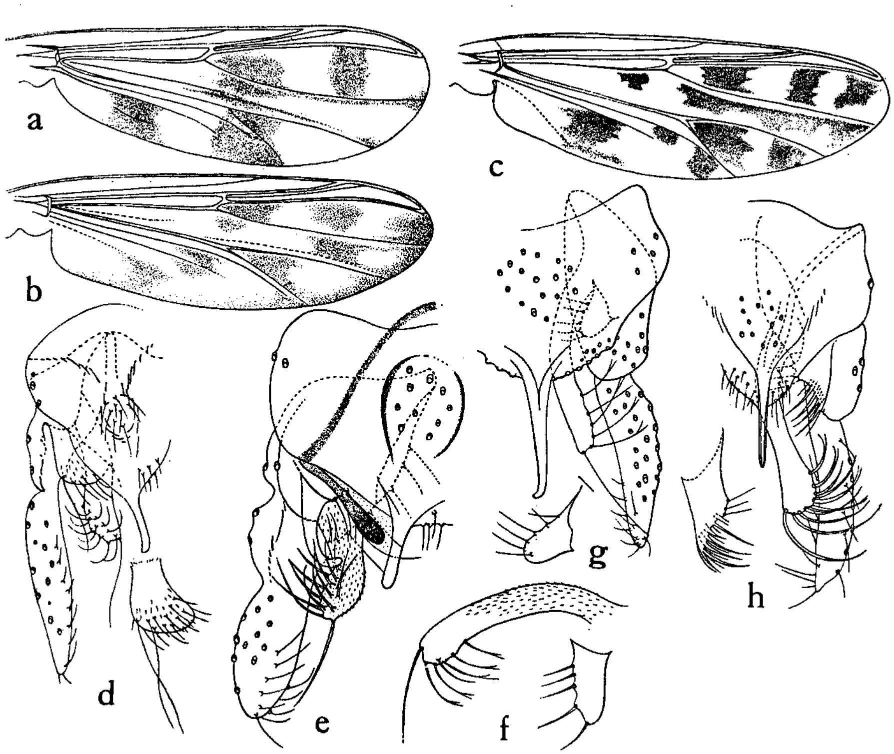


FIGURE 14.—*Polypedilum* (s. str.), female wings and male hypopygia: **a, d,** *P. concomitatus;* **b, e,** *P. albiceps;* **c,** *P. perturbans;* **f,** *P. insulanus,* appendages of hypopygium; **g,** *P. ponapensis;* **h,** *P. dybasi.*

66. Polypedilum (Polypedilum) albiceps (Johannsen). (Figure 14, *b, e.*)

Chironomus (*Polypedilum*) *albiceps* Johannsen, 1932, Archiv Hydrobiol. Suppl. 11, Tropische Binnengewässer **3**: 515.

Rather large brown species, wing with three faint gray clouds in cell R_5 and several in other cells. LR about 1.37-1.48, AR about 2.26-2.38, thorax without distinct scutal vittae.

Male: Body length 4.16-4.88 mm.; wing 2.2-2.47 mm. by 0.61-0.65 mm. Head mainly brown, face yellowish, mouthparts brown, frontal tubercles very small, as long as diameter of facet; palp brown or dark brown, five-segmented with RL about 12: 12.5: 37: 36.5: 50; antenna uniformly dark brown or brown, 14-segmented, AR 2.26-2.38. Thorax uniformly brown or fuscus brown, postscutellum darker, with 8 to 10 setae along caudal margin and five to seven small setae on anterior area. Legs with coxae brown, trochanters pale brown, femora entirely yellow in paler specimen, partly brown in darker specimen (fore femur mainly brown but yellow on basal and apical part, mid and hind femora with basal one-third or one-half brown, but basal end yellow), tibiae and tarsi yellow, but distal two segments very slightly brownish. LR about 1.48. Wing with about 10 faint gray clouds, small cloud just beneath r-m not extending far toward wing base beyond level of r-m, squama with about 12 marginal setae, fMCu under base of r-m, RL-V about 74.5: 48: 78: 77.5. Halter yellow or white. Abdomen brown or dark brown, with dark obscure stripe on middorsal line. Hypopygium (fig. 14, *e*) with anal point slender, curved ventrad, not extending beyond ventral appendage, style stout, oval or subtriangular in dorsal aspect, dorsal appendage rather long, arcuate, tapered blunt at tip, with three basal setae, without special long seta, ventral appendage stout, with single long apical seta not extending beyond style, about 14 to 16 strong bristles on apical half, double setae on middle part of dorsal side.

Female: Body about 2.54 mm. long; wings about 2.28 mm. by 0.74 mm. Coloration and structures generally similar to those of male with usual sexual differences, but wing marking (fig. 14, *b*) somewhat more distinct. RL of palpal segments 12: 12: 36: 36.5: 59. Antenna mainly yellow, but last segment fuscus, six-segmented (20: 35: 26: 24: 26: 46), segments 3 to 5 with neck part as long as one-third of the segments. Scutellum with about 12 setae along caudal margin and about 14 small setae on anterior part. LR about 1.38-1.45. Wing with marginal clouds extending along margin, squama with about nine marginal setae, RL-V about 71: 52: 87: 78.

DISTRIBUTION: Java, Bali I., Bonin Is., Caroline Is.

BONIN IS. CHICHI JIMA: Male, Futami-ko, at light, May 1956, Clagg.

PALAU. BABELTHUAP: Nine females, Ulimang, Dec. 1947, Dybas. KOROR: Male, entomology laboratory, light trap, Dec. 1952, Gressitt; four females, male, Angaur I., Feb. 1948, Dybas.

Micronesian specimens are slightly different from the East Indian ones in the value of AR and the relative lengths of the female antennal segments. Johannsen has reported that there are no frontal tubercles, but probably he has overlooked the minute tubercles which are present.

67. Polypedilum (Polypedilum) perturbans (Johannsen). (Figure 14, *c.*)

Chironomus (*Polypedilum*) *stictopterus* Kieffer var. *perturbans* Johannsen, 1932, Archiv Hydrobiol., Suppl. 11, Tropische Binnengewässer 3: 518.

Rather large brown and yellowish-brown species, wings with more distinct marking than in *albiceps* and basal small spot of wing cell M_1 situated far before level of r-m.

Female: Body length about 2.67 mm.; wings about 2.04 mm. by 0.66 mm. Head mainly yellowish brown. Antenna with scape pale brown, last segment fuscus yellow, other intermediate segments yellowish pale brown, five-segmented (18: 38: 28: 28: 16.5+50), neck parts of segments 3 to 4 almost half of the segments. Thorax mainly yellowish brown, but scutum somewhat fuscus on caudoscutal area, shoulder area and anterior margin, postscutellum, sternum and pleura largely brown, scutellum with about 13

bristles along caudal margin and five small setae on anterior part. Legs with coxae and trochanters brown, femora extensively brown, only apical one-fifth yellow, fore tibia entirely yellow, mid tibia yellow on basal one-fourth and brown on rest; scale of fore tibia with sharp spine, combs of mid tibia slightly separated and one comb with strong spur, but other one without spur. Wing with marking as in figure 14, *c*, squama with six marginal setae, fMCu slightly beyond level of r-m, RL-V about 61: 49: 81: 67. Halter yellow. Abdomen entirely pale brownish yellow.

DISTRIBUTION: Sumatra, Mariana Is.

S. MARIANA IS. GUAM: Two females, male, Sumay, July 1938, Oakley.

I have not seen the types of *P. perturbans* which are probably lost. However, as it can be identified easily from Johannsen's description and the present report, it represents a valid species rather than a variety.

68. Polypedilum (Polypedilum) ponapensis Tokunaga, n. sp. (fig. 14, *g*).

Medium-sized yellow species, tibial combs of mid and hind legs confluent, combs of mid tibia with two equal spurs, hind with single spur, AR 0.86 (0.8-0.9), LR about 1.69-1.84. Female antenna six-segmented, thoracic scutum without distinct vittae, legs very long, wings slender.

Male: Body length 2.69 (2.54-2.8) mm.; wing about 1.48 (1.34-1.57) mm. by 0.39 (0.36-0.42) mm. Body almost uniformly pale yellow. Head with eyes separated above as by one-third to one-fourth length of eye; RL of palpal segments about 12: 15.8: 44.5: 36: 51.3; antenna 14-segmented, with AR about 0.86 (0.8-0.9). Thorax without scutal vittae, scutellum with variable number of setae (usually 8, varying from 6 to 12) along caudal margin and usually one or more minute setae on anterior part, but sometimes minute ones absent. Legs pale yellow uniformly; fore tibial scale with minute apical spine, mid tibia with combs fused and two spurs equal, hind tibia with combs confluent but with only one spur; LR about 1.75 (1.69-1.84), RL-FT about 68.6: 47.1; empodium and pulvilli well-developed. Wings slender, with veins very pale yellow, squama usually with three, sometimes four to five marginal setae, anal lobe very much obtuse and round, RL-V about 43.8: 34.2: 60: 51.2, fMCu just or slightly beyond r-m. Halter white. Abdomen yellow; hypopygium (fig. 14, *g*) with anal point long, slender, arcuate, extending beyond ventral appendage, dorsal appendage broad, ovate, with four (three to seven) small setae on mesal side, ventral appendage with several (four to eight) forked bristles arranged in single line on dorsal side of apical two-fifths and single strong apical bristle extending level of tip of style.

Female: Body about 2.51 (2.34-2.6) mm. long; wings about 1.83 (1.77-1.89) mm. by 0.52 (0.48-0.53) mm. Coloration and structures generally similar to those of male. RL of palpal segments about 14: 19.7: 51: 43: 67.7; antenna six-segmented (16.7: 37.3: 28.7: 29.3: 24.3: 31.7), neck parts of intermediate segments as long as basal bulbs, last segment somewhat fuscus. Scutellum with 10 to 12 setae along caudal margin and from one to three small setae on anterior part. RL-FT about 89.3: 57.5. Squama of wing with four to five marginal setae, RL-V about 53: 43.3: 77.6: 61, fMCu under or slightly beyond r-m. Abdomen pale brownish yellow, with cerci pale yellow.

Holotype, male (BISHOP 3375), SE Nanpohnmal, 70 m., Ponape, light trap, Jan. 12, 1953, Gressitt. Allotype, female (BISHOP), Mt. Temwetemwensekir, Ponape, light trap, Jan. 15, 1953, Gressitt. Paratypes, male, Mt. Dolen Nankep, Ponape, Aug. 13, 1946, Townes; two males, Nanipil, Net Distr., Ponape, Mar. 14, 1948, Dybas; male, Agric. Expt. Sta., Colonia, Ponape, light trap, Jan. 7, 1953, Gressitt; female, four males, Mt. Temwetemwensekir, 180 m., Ponape, light trap, Jan. 15-19, 1953, Gressitt; seven females,

Mt. Kupwuriso, Ponape, Mar. 8-14, 1948, Dybas; female, male, Colonia, Ponape, Aug. 9, 1946, Townes.

Other specimens. Ponape: Three females, four males, Mt. Temwetemwensekir, 180 m., light trap, Jan. 16 and 19, 1953, Gressitt; two females, four males, Colonia, Aug. 9, 1946, Townes; two females, Airfield, Colonia, June-Sept., 1950, Adams; five females, 10 males, Mt. Dolen Nankep, Aug. 10-13, 1946, Townes; female, two males, Mt. Pairot, June-Sept. 1950, Adams; three males, data same as for holotype.

DISTRIBUTION: Caroline Is. (Ponape).

This species and the following *insulanus* are distinctly different from the other Micronesian *Polypedilum* species in possessing characteristic tibial combs and spurs of the mid and hind legs. *P. flavescens* Johannsen (Sumatra, Java, and Bali) is close to the present species in coloration, but the structure of the male hypopygium is quite different. The male hypopygium of the present species closely resembles that of *P. centralis* (Johannsen) (Java and Bali) except for the development of the anal point.

69. Polypedilum (Polypedilum) insulanus Tokunaga, n. sp. (fig. 14, *f*).

This species is closely allied to *ponapensis*, but differs in thorax not entirely pale yellow, scutum with three faint pale brownish vittae, postscutellum pale brown and always without accessory minute setae, AR always larger than 1.0, ventral appendage of male hypopygium with bristles only on apical quarter; females differ mainly in LR value.

Male: Body about 2.6 (2.4-2.8) mm. long; wings about 1.45 (1.33-1.52) mm. by 0.36 (0.33-0.39) mm. Head pale brownish yellow, eyes separated above by about one-third length of eye, RL of palpal segments about 10: 14: 40.3: 32: 48.4; antenna with scape yellow, flagellum and plumose hairs pale brown, 14-segmented, AR 1.29 (1.2-1.35). Thorax pale yellow, but three scutal vittae pale brownish yellow, postscutellum pale brown, lateral and ventral sides very pale brownish, scutellum usually with 8 (7 to 10) bristles along caudal margin. Legs entirely yellow, development of tibial scales, combs and spurs, empodia and pulvilli as in *ponapensis*, LR about 1.92, RL-FT about 69.5: 46.8. Wings narrow, slender, with anal lobe very obtuse and almost absent, veins pale yellow, squama with one to four marginal setae, fMCu just or slightly beyond r-m, RL-V about 42.3: 32.7: 58.7: 48. Halter white. Abdomen pale brownish yellow; hypopygium (fig. 14, *f*) with dorsal appendage thumblike, with four to five small setae on mesal side, ventral appendage with five to eight forked bristles on apical quarter besides single long apical seta.

Female: Body about 2.35 (2.28-2.43) mm. long; wings 1.75 (1.7-1.82) mm. by 0.47 mm. Structures and coloration generally as in male, with usual sexual differences. Palp five-segmented, RL about 11.7: 17.3: 53.3: 44.7: 75; antenna six-segmented, RL about 15: 40: 30: 30: 25: 28, neck parts of intermediate segments long, as long as basal bulb parts. Scutellum with 9 to 12 bristles along caudal margin. RL-FT about 89.9: 60.3. Wing with RL-V about 49.8: 41.5: 73:57.8, squama with three to five marginal setae. Abdomen and cerci entirely pale yellow.

Holotype, male (US 66564), Mt. Chukumong, 80 m., Wena I., Truk, light trap, Dec. 28, 1952, Gressitt. Allotype, female (US), Mt. Unibot, 200 m., Ton I., Truk, light trap, Jan. 3, 1953, Gressitt. Paratypes, five males, Mt. Chukumong, Wena I., Truk, Dec. 28, 1952 and Feb. 6, 1953, Gressitt; two

females, two males, Mt. Unibot, 25-50 m., Ton I., Truk, Dec. 30, 1952-Jan. 3, 1953, Gressitt; female, Wena I., Truk, July 31, 1946, Townes.

Other specimens. Truk: Four males, Mt. Unibot, Ton I., Dec. 30, 1952 and Jan. 3, 1953, Gressitt; seven males, Mt. Chukumong, 32-80 m., Wena I., light trap, Dec. 28, 1952-Jan. 3, 1953, Gressitt.

DISTRIBUTION: Caroline Is. (Truk).

70. **Polypedilum (Polypedilum) dybasi** Tokunaga, n. sp. (fig. 14, *h*).

Medium-sized, robust, brown or dark-brown species, scutum with four dark vittae, legs brown; AR about 1.02, LR about 2.14 in male and 2.03 in female, scutellum with small accessory setae on anterior part, female antenna five-segmented, last segment deeply constricted sub-basally.

Male: Body about 2.76 (2.6-3.06) mm. long; wings about 1.61 (1.56-1.72) mm. by 0.43 (0.42-0.46) mm. General coloration brownish, scutum brown with four vittae dark, ventral side and postscutellum dark brown, legs, antennae, and hypopygium brown, abdomen pale brown, but gradually more brownish on posterior segments. Head brown, eyes widely separated above, no frontal tubercles; palpal segments with RL about 10.3: 12: 32.8: 39.5: 59.5; antenna with scape dark brown, flagellum and plumose hairs brown, 14-segmented, AR 1.02 (1.01-1.03). Scutellum yellowish brown, with 8 to 10 bristles along caudal margin and two to six minute accessory setae on anterior part. Leg with fore tibial scale distinctly spined apically, tibial combs of posterior two pairs narrowly separated and one comb with long spur, other comb unarmed, pulvilli large; LR about 2.14 (2.03-2.21). Wing with fMCu just beyond r-m, RL-V about 48.5: 34.3: 62.3: 55.3. Halter white. Hypopygium (fig. 14, *h*) with anal point needlelike, almost straight, ending far before tip of ventral appendage, styles rather slender, dorsal appendage stout, slightly longer than wide, obliquely truncated, usually with four very strong bristles and several ordinary setae on truncated side, ventral appendage with 10 to 13 curved bristles on capitate part, some of these bristles forked apically, apical bristles not specially differentiated.

Female: Body about 2.43 (2.02-2.73) mm. long; wings about 1.74 (1.63-1.95) mm. by 0.52 (0.47-0.57) mm. Generally as in male with usual sexual differences. RL of palpal segments about 10: 10.3: 33: 43: 68.7; antenna with scape brown, flagellum yellowish brown, five-segmented (16.3: 35.5: 24.8: 26.3: 54.8), last segment deeply constricted subbasally. Scutellum with 8 to 10 caudal bristles and 3 to 10 accessory minute setae. LR about 2.06 (1.98-2.14). Wing with RL-V about 45.8: 39.3: 69.3; 55.5. Abdomen yellowish brown, with cerci yellowish white.

Holotype, male (US 66565), Ulimang, Babelthuap I., Palau, Dec. 10, 1947, Dybas. Allotype, female (US) with holotype. Paratypes, three females, four males, place same as for holotypes, Dec. 10-13, 1947, Dybas; two females, four males, Ngarabad, Koror I., Palau, at light, May 17, 1957, Sabrosky; female, male, Ngaremlengui, Babelthuap I., Palau, at light, June 1-3, 1957, Sabrosky; female, male, Ngiwal, Babelthuap I., Palau, at light, Apr. 19, 1957, Sabrosky; female, male, SE. Ulebsehel I., Palau, Apr. 24, 1957, Sabrosky.

Other specimens. Palau. Babelthuap I.: Seven females, 10 males, Ulimang, Dec. 10-26, 1947, Dybas; three females, male, Ngiwal, light trap, Aug. 15, 1951 and Dec. 16, 1952, Gressitt; 10 females, eight males, Ngiwal, at light, May 19 and 31, 1957, Sabrosky; 137 females, 44 males, Ngaremlengui, at light, June 1 and 3, 1957, Sabrosky; seven females, two males, Melekeiok, at light, Sabrosky; female, four males, Ngerehelong Pen., at light, May 8 and

June 2, 1957, Sabrosky; Koror I.: 17 females, eight males, Ngarabad, at light, May 17, 1957, Sabrosky; eight females, five males, SW. Koror, light trap, Dec. 5-18, 1952, Gressitt; two females, five males, Sept. 16, 1952 and May 1953, Beardsley; 14 females, two males, July 24 and 26, 1956, McDaniel; 16 females, 14 males, at light, Apr. 29-May 30, 1957, Sabrosky. Angaur I.: Male, Feb. 3, 1948, Dybas. Peleliu I.: Nine females, two males, N. end, at light, Apr. 24, 1957, Sabrosky. Yap. Yap I.: Three females, Dugor, Weloy, at light, June 1, and June 14, 1957, Sabrosky. Ponape: Female, SE. Nanpohnmal, light trap, Jan. 9, 1953, Gressitt. Kusaie: Female, Mutunlik, 22 m., light trap, Jan. 26, 1953, Clarke.

DISTRIBUTION: Caroline Is. (Palau, Yap, Ponape, Kusaie).

This species is highly specific in the structure of the dorsal appendage of the male hypopygium. The coloration resembles that of *P. callimorpha* Kieffer (Burma) and *P. limpidus* Johannsen (Sumatra).

71. Polypedilum (Polypedilum) medivittatus Tokunaga, n. sp. (fig. 15, *g*).

Chironomus (*Polypedilum*) sp. No. 17, Johannsen, 1932, Archiv Hydrobiol. Suppl. 11, Tropische Binnengewässer **3**: 524.

Medium-sized species, closely allied to *dybasi*, but distinctly differing as follows: AR about 1.88, LR about 1.96 in male and 1.94 in female, scutum paler and with fuscus ill-defined mid-dorsal vitta, scutellum without accessory minute setae, legs and wings very pale yellow, male hypopygium with anal point extending caudad beyond ventral appendages, dorsal appendage with bare slender apical projection, abdominal tergites fuscus.

Male: Body 2.89 (2.71-2.96) mm. long; wings 1.63 (1.56-1.69) mm. by 0.44 (0.43-0.44) mm. Head pale brownish yellow, vertex brown, no frontal tubercles; antenna entirely brown, 14-segmented, AR about 1.88 (1.81-1.96); palpal segments with RL about 9.5: 12: 32.5: 32.5: 53.5. Thorax with ground color pale brown or yellowish pale brown; scutum with fuscus ill-defined mid-dorsal vitta, caudoscutal area somewhat more brownish, lateral sides sometimes with very faint fuscus stripes; postscutellum dark brown; scutellum yellow, with seven bristles along caudal margin and no accessory small setae. Legs very slender, with coxae yellowish brown, other segments pale yellow or white, fore tibial scale pointed, middle and hind tibiae each with two combs barely separated and single long spur; LR about 1.91 (1.85-2.0). Wing with anterior veins very pale yellow, anal lobe obtuse and round, squama with five to nine marginal setae, fMCu just beyond r-m, RL-V about 50.7: 33: 60: 56.7. Halter white. Abdomen with ill-defined fuscus stripe along mid-dorsal line on tergal side, sometimes tergites almost uniformly fuscus, sternites yellow. Hypopygium (fig. 15, *g*) with anal point slender, style slender, dorsal appendage with base triangular and setigerous with three hairs, distal bare projection very slender, slightly arcuate and without special seta, ventral appendage not beyond tip of anal point, capitate, usually with six, rarely five curved apical bristles, some of these bristles finely bifid apically, apical special bristle very long and extending caudad as far as tip of style.

Female: Body about 2.3 (2.08-2.57) mm. long; wings 1.54 (1.5-1.61) mm. by 0.5 (0.48-0.53) mm. Coloration generally as in male. RL of five palpal segments about 10.5: 13: 30.5: 32.5: 58. Antenna five-segmented (16.7: 36: 25.3: 26.7: 55), last segment deeply constricted sub-basally. Scutellum with seven to nine bristles along caudal margin. LR about 1.9 (1.8-1.97). Wing with fMCu slightly beyond r-m, RL-V about 45.3: 33: 63.3: 50.7, squama with seven to nine marginal setae. Abdomen with cerci white.

Holotype, male (US 66566), Ulimang, Babelthuap I., Palau, Dec. 10, 1947, Dybas. Allotype, female (US), same place as for holotype, Dec. 19, 1947, Dybas. Paratypes, six females, two males, same place as for holotype, Dec. 10-26, 1947, Dybas; female, three males, Ngaremlengui, Babelthuap I., Palau, at light, June 3-6, 1957, Sabrosky; four females, two males, Ngerehelong Pen., Babelthuap I., Palau, May 6 and Dec. 17, 1947, Dybas; male, same, at light, May 7, 1957, Sabrosky; female, Melekeiok, Babelthuap I., Palau, at light, May 22, 1957, Sabrosky; female, Koror I., Palau, Nov. 21, 1947, Dybas; female, male, Koror I., July 26, 1956, McDaniel; two females, three males, Koror I., at light, Apr. 29 and May 16, 1957, Sabrosky; two females, male, Dugor, Weloy, Yap I., at light, May 6, 1957, Sabrosky; female, Gachapar, Gagil, Yap, June 19, 1957, Sabrosky.

Other specimens. S. Mariana Is.: Female, three males, Nimitz Hill, Guam, May 4, 8 and 10, 1956, Clagg. Palau, Babelthuap I.: 487 females, 76 males, Ngaremlengui, at light, May 1-July 1, 1957, Sabrosky; 32 females, male, Ngiwal, light trap, Aug. 15, 1951, Gressitt; three females, Ngiwal, Dec. 16, 1952, Gressitt; 263 females, Ngiwal, at light, May 19-31, 1957, Sabrosky; 40 females, 13 males, Ulimang, Dec. 10-26, 1947, Dybas; three females, 106 males, Ngerehelong Pen., at light, May 6 and 7, 1957, Sabrosky; 149 females, 213 males, Melekeiok, at light, May 22, 1957, Sabrosky; male, Lake Ngardok, May 22, 1957, Sabrosky; 42 females, 11 males, Netkeng, Imeliik, July 26, 1956, McDaniel; male, Babelthuap I., Dec. 16, 1947, Dybas; male, E. Ngatpang, 65 m., light trap, Dec. 10, 1952, Gressitt; female, Ngaremeskang, Dec. 21, 1952, Gressitt; female, Iwang, Dec. 19, 1952, Gressitt. Palau, Peleliu I.: Seven females, two males, July 28-Aug. 12, 1945, Dybas; three females, Asias, in club-house, Apr. 26, 1936, Kondo; male, E. coast, Aug. 31, 1945, R. H. Baker; eight females, male, Aug. 30, 1948, Dybas; 689 females, 10 males, at light, May 28, 1957, Sabrosky; three females, Apr. 24-26, 1936, Kondo; two females, male, Aug. 5, 1954, Hagen. Palau, Koror I.: Two females, Ngarbaged, Dec. 18, 1937 and June 7, 1938, Murakami; eight females, six males, Ngarbaged, May 17, 1957, Sabrosky; nine females, 17 males, Ent. Lab., Koror, light trap, Dec. 5, 1952, Gressitt; 26 females, 51 males, SW. Koror I., light trap, Dec. 5-18, 1952, Gressitt; nine females, nine males, Aug. 11 and Sept. 14-16, 1952 and Apr. 6-16, 1953, Beardsley; 66 females, 45 males, July 24, 1956, McDaniel; three females, Nov. 18 and 30, 1947 and Jan. 1948, Dybas; 204 females, 82 males, Feb. 2, Apr. 13-30, May 16 and 29, 1957, Sabrosky. Palau, Ulebsehel I.: Female, Oct. 1, 1952, Krauss. Yap, Yap I.: 16 females, Kolonia, at light, June 21, 1957, Sabrosky; 58 females, three males, Kolonia, at light, June 21, 1957, Sabrosky; 58 females, three males, Kolonia, at light, July-Aug. 1950, Goss; 37 females, 30 males, Hill behind Yaptown, light trap, Nov. 28 to Dec. 3, 1952, Gressitt; 34 females, three males, Dugor, Weloy, at light, May 6 to June 14, 1957, Sabrosky; five females, Dugor, Weloy, July

14, 1950, Goss; male, Giliman, at light, June 10, 1957, Sabrosky; four females, male, C. Yap I., Aug. 21, 1950, Goss. Yap, Gagil-Tomil: Female, Gagil Distr., July-Aug., 1950, Goss. Yap, Rumung I.: Five females, July-Aug. 1950, Goss. Ponape: Female, Mt. Kupwuriso, June-Sept. 1950, Adams.

DISTRIBUTION: S. Mariana Is. (Guam), Caroline Is. (Palau, Yap, Ponape).

Johannsen's unnamed species No. 17, based on a single female from South Sumatra, is identical to the present species.

72. **Polypedilum (Polypedilum) nigribasalis** Tokunaga, n. sp. (fig. 15, *f*).

Rather large dark and yellow species, with characteristic coloration, thorax very shiny, varying from entirely yellow to entirely dark, usually postscutellum and anterior part of scutum dark and scutellum and posterior part of scutum yellow, abdomen yellowish or pale brownish, but first basal segment always with large dark paired lateral spots on tergite; legs mainly pale, but fore leg with distal part of femur and entire length of tibia dark. AR about 1.44, female antenna six-segmented, LR about 1.77 in male and 2.12 in female.

Male: Body length about 3.93 (3.84-4.16) mm.; wings about 1.84 (1.56-2.04) mm. by 0.47 (0.4-0.51) mm. Thorax and legs mainly yellow, but postscutellum sometimes more brownish, fore tibia and distal part of femora dark; abdomen yellowish pale brown, but basal segment with large dark lateral spots and posterior segments including hypopygium brown. Head brown, with eyes narrowly separated above, mouthparts entirely yellowish brown; antenna with scape yellow, other segments and plumose hairs entirely brown, 14-segmented, AR about 1.44 (1.4-1.5). Thorax entirely yellow and distinctly shining, scutellum with 8 to 10 bristles along caudal margin, no accessory small setae. Legs mainly pale brownish yellow or yellow, but in fore leg distal end or distal two-thirds of femur and entire tibia dark brown, fore tibial scale pointed apically, mid and hind tibiae each with two subconfluent combs and single spur, LR about 1.77. Wing entirely pale brown, with anal lobe very obtuse and round, costa ending just before wing tip and just above tip of M_{1+2}, fMCu only slightly beyond r-m, RL-V about 57.3: 44: 74.3: 65.3, squama with three to six marginal setae. Halter yellowish white. Abdomen yellowish brown, but posterior segments more brownish and first basal segment with paired large dark lateral spots. Hypopygium (fig. 15, *f*) yellowish brown, anal point dark, very long, style slender, dorsal appendage fingerlike, with four to five apical and three sub-basal setae, ventral appendage long, but not beyond anal point, not distinctly capitate, with five to eight long, erect, equal bristles, some of these bristles bifid at tips.

Female: Body about 2.75 (2.73-2.8) mm.; wings about 2.11 (2.05-2.17) mm. by 0.6 (0.55-0.61) mm. Coloration distinctly different from opposite sex, especially that of thorax being more or less darkened. Palp with five segments in RL of 14.7: 25: 62.7: 42.3: 69; antenna six-segmented, with scape yellow, following segments brown or pale brown, RL of segments about 22.3: 47.3: 32.7: 30: 29: 29.7. Thorax of paler specimen (allotype) anterior half of scutum, caudal half of postscutellum, entire propleura and metapleura dark, other parts yellow, but in darker specimens (paratypes) darker parts extending in various degrees and in darkest specimens almost entirely dark; scutellum with 9 to 11 bristles along caudal margin. Legs in paler specimens mainly yellowish white, but distal half of fore femur and entire fore tibia dark, middle and hind tibiae sometimes slightly brownish, two to three distal tarsal segments pale brown, in darker specimens legs slightly more brownish or darker; LR far larger than in male, about 2.11. Wing with RL-V about 62.3: 48: 86: 70.3, squama with four to seven marginal setae. Abdomen yellowish pale brown, two lateral dark spots of basal segment sometimes confluent, and in some paratypes tergites 2 and 3 each with obscure caudal brownish band.

Holotype, male (US 66567), Dugor, Weloy, Yap I., at light, June 1, 1957, Sabrosky. Allotype, female (US) with holotype. Paratypes, female with holotype; two females, Yaptown, Yap I., at light, June 21, 1957, Sabrosky; male, Hill behind Yaptown, 50 m., light trap, Dec. 2, 1952, Gressitt; female, Ngiwal, Babelthuap I., Palau, at light, May 19, 1957, Sabrosky; two males, Ngaremlengui, Babelthuap I., Palau, at light, June 3, 1957, Sabrosky; female,

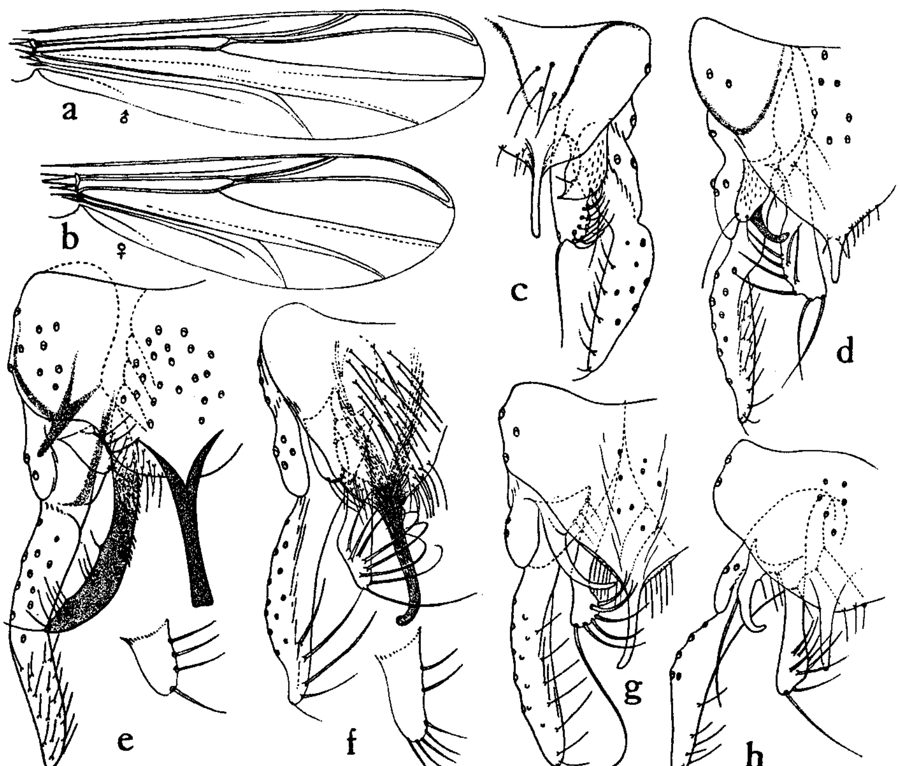


FIGURE 15.—*Polypedilum* (s. str.), wings and male hypopygia: **a-c**, *P. spadix;* **d**, *P. albicorpus;* **e**, *P. longilobatus;* **f**, *P. nigribasalis;* **g**, *P. medivittatus;* **h**, *P. yapensis.*

Airai, Ngarsung, Babelthuap I., Palau, at light, May 9, 1957, Sabrosky; female, Colonia, Ponape, June-Sept. 1950, Adams.

Other specimens. Palau. Babelthuap I.: Male, Ngaremlengui, at light, June 1, 1957, Sabrosky. Yap: Female, near Yaptown, Yap I., July 14, 1946, Townes; male, Weloy, Yap I., at light, June 20, 1957, Sabrosky; female, Rumung I., June 19, 1957, Sabrosky; female, Mt. Madaade, 60 m., Yap I., light trap, Dec. 2, 1952, Gressitt.

DISTRIBUTION: Caroline Is. (Palau, Yap, Ponape).

The distinctive coloration of this species separates it from other known species in East Asia.

73. **Polypedilum (Polypedilum) longilobatus** Tokunaga, n. sp. (fig. 15, *e*).

Medium-sized, pale yellow and brown or dark brown species, thorax extensively yellowish white, but scutellum and postscutellum dark brown, legs mainly yellow, but all femora and trochanters slightly brownish and brown on distal parts, fore tibia brown on distal end, in male mid and hind femora with faint ill-defined basal and middle yellowish-brown bands. AR about 1.18; LR 1.73 in male and 1.42 in female; scutellum with many bristles and accessory small setae; fore tibial scale sharply pointed, mid and hind tibiae each with two combs subconfluent and spur single; wing narrow, with anal lobe highly reduced.

Male: Body length 3.33 (3.15-3.51) mm.; wings 1.65 (1.57-1.72) mm. by 0.43 (0.42-0.44) mm. Head with vertex pale brownish yellow, frons yellow, mouthparts brown; eyes separated above by width of six to seven facets or one-fourth of length of eye; palp five-segmented (15: 17.5: 51.5: 44.5: 74.5); antenna with scape yellow, other segments and plumose hairs brown, 14-segmented, AR 1.18 (1.14-1.22). Thorax extensively white or yellowish, but scutellum and postscutellum dark brown, scutellum with 9 to 11 bristles along caudal margin and seven to eight smaller setae on anterior part. Legs mainly yellow, but distal ends of all coxae, entire lengths of trochanters, femora and last two tarsal segments pale brownish, in fore leg distal ends of femur and tibia more brownish, tarsal segments apically pale brown, in other legs femora with ill-defined pale brown bands at bases and middle parts and brown bands at tips; LR about 1.73, RL-FT about 83: 56.3, empodium and pulvilli well developed, mid and hind tibiae each with single short spur and subconfluent combs. Wing slender, with veins pale yellow, anal lobe highly reduced, anal angle obtuse, squama with four to seven marginal setae, fMCu slightly beyond r-m, RL-V about 48: 39: 67: 58. Halter white. Abdomen pale brownish yellow; hypopygium (fig. 15, *e*) brown, with anal point very long, dark, style slender, with many setae on mesal side of apical half, dorsal appendage short, thumblike, with four to six delicate setae, ventral appendage very long, not capitate, arcuate, pubescent on basal half, with 7 to 10 rather small setae on apical half beside single slightly longer apical seta.

Female: Body length 2.73 (2.6-2.86) mm.; wing 1.93 (1.85-2.02) mm. by 0.55 (0.52-0.59) mm. General coloration similar to that of male, but scutum with three vittae very pale brown and dark spots just behind white humeral areas, pronotal lateral lobes dark, pleuron with dark-brown spots beneath wing base, legs with markings more obscure and fainter than in male. Head with eyes separated wider than in male; palp five-segmented (15.5: 17.5: 56: 55: 101.5); antennae with scape yellow, flagella missing. Scutellum with 13 to 14 bristles along caudal margin and 10 to 6 smaller setae on anterior part. LR about 1.42; RL-FT about 99.5: 66. Wing with very faint small brown cloud on r-m, squama with four to five marginal setae, RL-V about 54.8: 52.5: 81: 63.5. Abdomen yellowish white, but posterior segments pale brownish, sides of first basal segment brown, cerci pale brownish yellow.

Holotype, male (US 66568), Mt. Teroken, Wena I., Truk, 80 m., light trap, Dec. 28, 1952, Gressitt. Allotype, female (US) with holotype. Paratypes (BISHOP), female and male with holotype.

Other specimens. Truk: Female, two males, Mt. Teroken, Wena I., light trap, Dec. 28, 1952 and Jan. 5-6, 1953, Gressitt.

DISTRIBUTION: Caroline Is. (Truk).

The present species somewhat resembles *P. convictus* Walker (Palaearctic) and *P. kibatiense* Goetghebuer (South Africa) in coloration, but the male hypopygium differs conspicuously from those of the allied species.

74. Polypedilum (Polypedilum) spadix Tokunaga, n. sp. (fig. 15, *a-c*).

Small brown species; wing with veins brown, halter brown; AR about 0.8, female antenna five-segmented; scutellum with only three to six setae along caudal margin; halter brown, wing vein R_1 and R_{4+5} distinctly divergent, fMCu under basal one-third of R_1 in male and one-fourth in female, anal lobe absent; LR 1.5-1.55, fore tibial scale without spine, round on apical margin, two tibial combs separated and only single spur developed.

Male: Body length 1.93 (1.78-2.13) mm.; wings 1.17 (1.05-1.29) mm. by 0.3 (0.27-0.31) mm. Head entirely brown, no frontal tubercles, eyes bare, separated above by one-third length of eye; palp five-segmented (10: 12: 24: 27: 32); antenna entirely brown, AR 0.8 (0.76-0.88). Thorax almost uniformly brown, but shoulder parts somewhat paler, scutellum with three to five setae along caudal margin. Legs entirely brown, fore tibial scale round on apex, middle and hind tibiae each with single long spur and two combs separated. Wing (fig. 15, *a*) pale brown, anal lobe absent, squama with one or two marginal setae, R_1 and R_{4+5} distinctly divergent, fMCu under basal one-third of R_1, RL-V 34.5: 22.5: 44.8: 44.8. Halter brown. Abdomen brown; hypopygium (fig. 15, *c*) brown, with anal point slender, hardly reaching tip of ventral appendage, style rather small, as long as coxite, dorsal appendage stout, thumblike, abruptly and sharply pointed mesad at tip, pubescent on lateral half, with single minute and long seta on apical part, ventral appendage rather short, ending at level of base of style, with 8 to 10 curved bristles on apical capitate part besides single long apical seta.

Female: Body length 1.38 (1.22-1.56) mm.; wings 1.03 (0.95-1.14) mm. by 0.33 (0.31-0.34) mm. Very closely resembling male with usual sexual differences. Head with eyes separated by one-third length of eye; palp five-segmented (7.4: 10.4: 21: 26.4: 35); antenna five-segmented (14.3: 26.5: 20: 21.1: 11+28.8), last segment rather deeply constricted sub-basally. Scutellum with four to six setae along caudal margin. Legs rather stout, LR about 1.5-1.55. Wing (fig. 15, *b*) subcuneiform, squama with two to four marginal setae, fMCu under basal one-fourth of R_1 and rarely one-fifth of it, RL-V about 29.8: 19.4: 42.8: 36. Abdomen brown, with cerci pale brown.

Holotype, male (US 66569), Ngaremlengui, Babelthuap I., Palau, at light, June 3, 1957, Sabrosky. Allotype, female (US) with holotype. Paratypes, 10 females, male, place same as for holotype, June 1 and 3, 1957, Sabrosky; two females, male, Ngarabad, Koror I., Palau, at light, May 17, 1957, Sabrosky; female, Dugor, Weloy, Yap I., June 1, 1957, Sabrosky.

Other specimens. Palau: 46 females, two males, Ngaremlengui, Babelthuap I., at light, June 1 and 3, 1957, Sabrosky; three females, male, Ngarabad, Koror I., at light, May 17, 1957, Sabrosky.

DISTRIBUTION: Caroline Is. (Palau, Yap).

This is related to *P. annulatus* Freeman (South Africa) in the general coloration and the structure of the male hypopygium, but differs in that the abdominal pale or pruinose bands are always absent, the halters are always brown, pleural stripes are darker and it has a beaklike projection on the dorsal appendage of the male hypopygium.

75. Polypedilum (Polypedilum) albicorpus Tokunaga, n. sp. (fig. 15, *d*).

Small white species, closely resembling *yapensis,* but distinct as follows: Body slightly larger, AR larger, 1.38-1.5, scutellum more setigerous and with accessory small setae on anterior part, wing with six to nine marginal setae of squama, male hypopygium with smaller anal point, dorsal appendage with basal pubescent area well-developed, apical bare slender part smaller and special long seta located on apical humplike part of basal area.

Male: Body length 2.43 mm.; wings about 1.56 (1.38-1.7) mm. by 0.44 (0.4-0.47) mm. Almost entirely white, but vertex of head pale brownish yellow, hypopygium and scapes of antennae yellowish white, flagellar segments and plumose hairs of antennae yellowish brown. Head with eyes separated above by one-fourth length of eye; palp white, five-segmented (10.8: 12.1: 26.5: 27.5: 42.5); AR about 1.43 (1.37-1.5). Thorax white, scutellum with six to eight bristles along caudal margin and two to three small accessory setae at middle. Legs with fore tibial scale round on apical part, combs of mid and hind tibia separated, spurs of these tibiae single and very long, pulvilli well-developed and bifid, RL-FT about 68: 40, LR about 2.03. Wing with anal lobe slightly developed, anal angle obtuse and round, costa ending at wing tip, fMCu slightly beyond r-m, squama with six to nine marginal setae, RL-V about 47.8: 34: 61.8: 57. Halter white. Abdomen white; hypopygium (fig. 15, *d*) with anal point small, style rather slender, with many delicate setae on mesal side, dorsal appendage with basal pubescent part longer than apical bare part, with 0 to 2 small basal setae, basal part forming a blunt apical humplike projection and with single long seta and rarely another small seta on this projection, apical bare part slender and arcuate, ventral appendage almost straight, slightly swollen on apical half, with seven to nine straight bristles on apical one-third and single strong bristle at apex.

Female: Unknown.

Holotype, male (US 66570). Ngaremlengui, Babelthuap I., Palau, at light, June 2, 1957, Sabrosky. Paratypes, male, same locality as for holotype, at light, June 1, 1957, Sabrosky; male, Ngerehelong Pen., Babelthuap I., Palau, Dec. 17, 1947, Dybas, two males, same locality, May 6, 7, 1957, Sabrosky.

DISTRIBUTION: Caroline Is. (Palau).

76. Polypedilum (Polypedilum) yapensis Tokunaga, n. sp. (fig. 15, *h*).

Small yellowish-white species; fore tibial scale round apically, mid and hind tibiae each with single long spur and two combs barely separated; AR 0.9-1.04, female antenna five-segmented, intermediate segments with distinct neck parts; wing with anal lobe moderately developed, R_1 and R_{4+5} distinctly divergent.

Male: Body length 1.86 (1.83-1.89) mm.; wings 1.17 (1.11-1.25) mm. by 0.35 (0.33-0.36) mm. Head yellow, with mouthparts white, eyes separated above by about one-third length of eye; palp white, five-segmented (5: 12: 20: 24: 35); antenna with scape yellow, following segments more or less brown, AR 0.9-1.04. Thorax entirely white, scutellum with four bristles. Legs entirely white, fore tibial scale round on apical margin, mid and hind tibiae each with single long spur and just separated two combs, hind tibia rarely with another minute spur; RL-FT about 47.7: 27; pulvilli well-developed. Wing almost colorless and hyaline, with anal lobe somewhat developed, anal angle round, squama with four marginal setae, fMCu slightly beyond r-m, R_1 and R_{4+5} slightly divergent, RL-V about 34.3: 25: 45.7: 42.7. Halter white. Abdomen entirely white; hypopygium (fig. 15, *h*) with anal point rather slender, ending before tip of ventral appendage, style slender, slightly swollen at middle, dorsal appendage basally pubescent and with two to three basal setae, distal part slender, bare, tapered, arcuate and with single long seta at middle, ventral appendage almost straight, slightly clavate, with six to eight straight bristles besides a single long apical bristle.

Female: Body about 1.3 mm. long; wings 1.29 mm. by 0.41 mm. Slightly more yellowish than male; head pale brown. Eyes separated above by one-fourth length of eye; palp five-segmented (10: 10: 22: 25: 30); antenna five-segmented (15: 33: 21: 23: 50), intervening segments with elongate neck parts. Scutellum with seven setae along caudal margin. Legs with pulvilli bifid; RL-FT about 54: 30. Wing with marginal setae of squama 4, RL-V about 36: 27: 55: 95. Abdomen and cerci entirely yellowish white.

Holotype, male (US 66571), Hill behind Yaptown, 50-60 m., Yap I., light trap, Nov. 29, 1952, Gressitt. Allotype, female (US), place same as for holotype, light trap, Dec. 1, 1952, Gressitt. Paratypes, male, place same as for holotype, Dec. 3, 1952, Gressitt; male, Ngerehelong Pen., Babelthuap I., Palau, at light, May 7, 1957, Sabrosky.

Other specimen. Palau: Male, Ngerehelong Pen., Babelthuap I., at light, May 7, Sabrosky.

DISTRIBUTION: Caroline Is. (Palau, Yap).

This is closely allied to *P. flavescens* Johannsen known from Java, Sumatra, and Bali, but in that species the fore tibial scale is pointed, the costa ends distinctly before the wing tip, and the body is far larger than in *P. yapensis.*

Subgenus **Pentapedilum** Kieffer

Pentapedilum Kieffer, 1913, Soc. Hist. Nat. Metz, Bull. **28**: 25; 1923, Soc. Ent. France, Ann. **92**: 166.—Goetghebuer, 1938, IN Lindner, Flieg. Palaearkt. Reg. **13**, c: 77.—Freeman, 1954, Ent. Soc. London, Proc. B, **23**: 22; 1958, British Mus. (N. H.) Ent. Bull. **6**: 298.

Tanytarsus Kieffer, 1913, Voy. Alluaud et Jeannel, Afr. Orient, Ins. Dipt. **1**: 24 (in part).

Rosenia Kieffer, 1921, Soc. Sci. Bruxelles, Ann. **40**: 275; 1921, Soc. Ent. France, Ann. **90**: 34; 1923, Ibid. **92**: 167.

Kribiopelma Kieffer, 1921, Soc. Ent. France, Ann. **90**: 34; 1923, Ibid. **92**: 168.

Pentapedilum subgenus *Pentapedilum,* Goetghebuer, 1928, Faune France **18**:100.—Edwards, 1929, Ent. Soc. London Trans. **77**:376.

Chironomus subgenus *Pentapedilum,* Edwards, 1931, Diptera of Patagonia and South Chile **2**: 310.

Polypedilum subgenus *Pentapedilum,* Townes, 1949, Am. Midland Naturalist **34**: 61.

Male antennae 14-segmented, AR not much over 1.0, female antennae six-segmented; pronotum reduced, not reaching anterior margin of scutum. Fore tibial scale usually round or subtriangular and often with very short apical spur, middle and hind tibial combs quite separated, one comb with long spur and other unarmed; pulvilli as in subgenus *Polypedilum.* Anal area of wing obtusely round and often highly reduced, wing membrane hairy on most of surface, rarely highly reduced, only on apical tip in male; fMCu generally well beyond r-m. Male hypopygium with anal point well-developed, dorsal appendage with single long seta, ventral appendage with single long terminal bristle.

Key to Micronesian Species of Subgenus Pentapedilum

1. Wing veins R_1 and R_{4+5} almost parallel and closely approximate to each other; macrotrichia usually thickly spread all over surface, bare areas along veins indistinct 2
   Wing veins R_1 and R_{4+5} divergent distally and widely separated at apices; macrotrichia usually sparsely spread, bare areas along veins very broad 4

2(1). Fore tibial scale with apical spur; LR larger than 2.0 .... **77. convexum**
   Fore tibial scale without apical spur; LR smaller than 2.0 3

3(2). Scutal vittae pale and ill-defined; fore tarsal segment 3 shorter than 4 in male .... **78. nodosum**
   Scutal vittae distinct; fore tarsal segment 3 as long as 4 in male .... **79. esakii**

4(1). Wing not cuneiform; dorsal appendage of male hypopygium with basal bristle .... **80. elongatus**
   Wing cuneiform; dorsal appendage of male hypopygium with preapical bristle 5

5(4). Fore LR larger than 2.0; dorsal appendage of male hypopygium slender and strongly arcuate .... **81. palauensis**
   Fore LR smaller than 2.0; dorsal appendage of male hypopygium stout and strongly swollen preapically .... **82. trukensis**

77. Polypedilum (Pentapedilum) convexum (Johannsen). (Figure 16, *a*.)

Pentapedilum convexum Johannsen, 1932, Archiv Hydrobiol. Suppl. 9, Tropische Binnengewässer **3**: 540.

Small yellow species, scutum with three faintly brown vittae, AR 1.14-1.28, female antenna five-segmented, fore tibial scale sharply pointed apically, LR 2.43-2.55 in male and 2.54 in female; scutellum with six to eight bristles and without accessory setae; wing of male with macrotrichia sparsely spread on almost entire surface, but in female rather dense.

Male: Body about 1.64 mm. long; wings about 1.13 mm. by 0.33 mm. Head yellow, with eyes separated above by one-fourth length of eye; palp five-segmented (8: 9.5: 21.5: 28: 42.5); antenna 14-segmented, scape yellow, flagellum and plumose hairs brown, AR about 1.14-1.28. Thorax mainly yellow, scutum with three slightly brownish vittae, postscutellum pale brown, scutellum with six bristles along caudal margin but rarely with eight bristles. Legs yellowish pale brown, fore tibial scale sharply pointed, mid and hind tibiae each with single long spur and two combs separated, LR about 2.43-2.55, RL-FT about 46.8: 25. Wing with anterior veins very pale yellow, macrotrichia sparsely distributed along marginal area and very sparse on central part, anal lobe almost absent, squama with three to five setae, R_{4+5} only very slightly curved, slightly divergent from R_1, fMCu just beyond r-m, RL-V 31.3: 23.3: 43.8: 36. Halter yellow. Abdomen yellowish pale brown; hypopygium (fig. 16, *a*) with anal point broad, subspatulate, median furrow distinct, dorsal appendage with triangular basal portion, three to six basal setae, apical portion needlelike, a single long bristle at base of apical bare portion, ventral appendage slightly capitate, with three to six bristles on apical one-third and single apical seta almost reaching tip of style.

Female: Body about 1.46 mm. long; wings about 1.13 mm. by 0.36 mm. Very similar to male. Palp five-segmented (8: 11: 23: 30: 40); antenna with scape yellow, flagellum pale brownish yellow, five-segmented (13: 28: 20: 20: 12+28). Legs yellow or pale brownish yellow, LR about 2.54, RL-FT about 45.5: 23. Wing with macrotrichia spread all over surface, squama with two to four marginal setae, R_{4+5} narrowly separated from R_1 and costa, fMCu slightly beyond r-m, RL-V about 30.5: 23: 48.5: 35.5. Halter yellowish pale brown. Abdomen yellow, cerci yellow.

DISTRIBUTION: Sumatra, Caroline Is.

PALAU. BABELTHUAP: Female, four males, Ngaremlengui, at light, June 1957, Sabrosky; two males, Netkeng, Imeliik, at light, June 1957, Sabrosky; 11 males, Ngaremeskang, 30 m., light trap, Dec. 1952, Gressitt.

PONAPE. Male, Mt. Temwetemwensekir, 180 m., Jan. 1953, Gressitt.

The Micronesia specimens are a little different from the original specimens in the coloration and the thickness of the macrotrichia of the male wings, but main specific characters coincide well. The illustration of the male hypopygium by Johannsen appears inadequate.

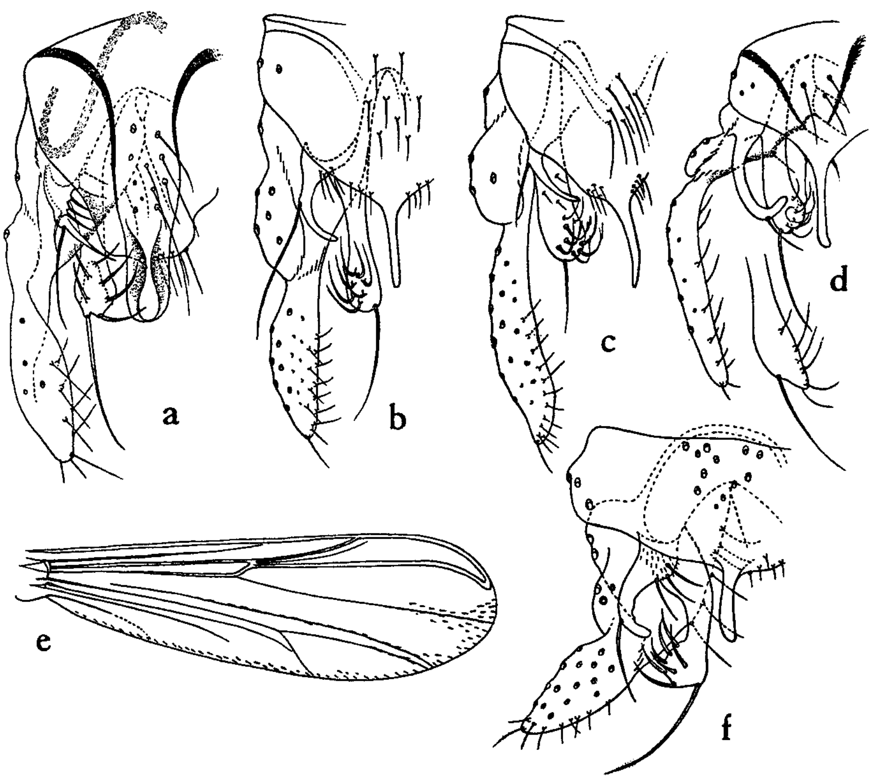


FIGURE 16.—*Polypedilum* (*Pentapedilum*), female wing and male hypopygia: **a**, *P. convexum;* **b**, *P. nodosum;* **c**, *P. elongatus;* **d**, **e**, *P. palauensis;* **f**, *P. esakii.*

78. Polypedilum (Pentapedilum) nodosum (Johannsen). (Figure 16, *b.*)
Pentapedilum nodosum Johannsen, 1932, Archiv Hydrobiol. Suppl. 11, Tropische Binnengewässer **3**: 541.

Small pale brownish yellow species, scutum with more or less brownish or fuscus vittae; AR 0.53-0.8; LR about 1.7 in male, 1.56-1.84 in female; fore tibial scale

without apical spine, in male fore leg tarsal segment 4 distinctly longer than 3; mid and hind tibiae each with single long spur and two separated combs; scutellum with 7 to 10 bristles and without small accessory setae; wing without anal lobe, with macrotrichia rather densely spread on entire surface.

Male: Body about 1.63 (1.46-1.82) mm. long; wings 1.14 (1.09-1.22) mm. by 0.33 (0.31-0.34) mm. Head yellowish brown, with eyes narrowly separated by width of three facets, no frontal tubercles; palp five-segmented (7.5: 9.3: 24.5: 24.3: 35.8); antenna 14-segmented, with scape yellowish brown, flagellum and plumose hairs brown, AR 0.71 (0.53-0.8), last segment subequal to preceding nine segments combined. Thorax largely yellowish brown, scutum with four fuscus short vittae, scutellum with 8 to 10 bristles along caudal margin, without accessory small setae. Legs yellowish brown, fore tibial scale without apical spine, middle and hind tibiae each with single long spur and two combs separated, pulvilli as large as claws, LR about 1.7-1.72, RL-FT about 39.5: 25.5, RL-T about 41.3: 27.5: 8.8: 14.8: 8. Wing with anal lobe almost absent, macrotrichia rather densely spread on entire surface, anterior veins very pale brown, squama with two to three marginal setae, fMCu slightly beyond r-m, R_1 and R_{4+5} extending closely to each other, costa ending just before wing tip, RL-V about 31.3: 24.8: 44: 38.8. Halter pale brown or slightly fuscus yellow. Abdomen with tergite pale brown; hypopygium (fig. 16, *b*) yellowish brown, with anal point slender, ending before tip of ventral appendage, style rather stout, with many delicate setae on mesal side, dorsal appendage with three basal setae, elongate bare part slender, arcuate, with single long bristle at middle.

Female: Body about 1.49 (1.12-1.81) mm. long; wings about 1.09 (1.01-1.23) mm. by 0.37 (0.35-0.4) mm. General coloration slightly more brownish than in male, general structure as in male with usual sexual difference. Palp with five segments in RL of 7.3: 8.8: 22.3: 24.8: 37.5; antenna five-segmented, with scape yellowish pale brown, flagellum pale brown, last segment deeply constricted sub-basally, RL of segments about 12.8: 25: 19.3: 19.5: 11.5+27.5. Scutellum with 6 to 10 bristles along caudal margin. Leg with RL-FT about 35.6: 23.9, LR about 1.68 (1.56-1.84). Wing with RL-V about 28.4: 23: 43.8: 34.5. Abdomen yellow, but caudal segments slightly fuscus or brownish, cerci subtriangular and yellow or pale brownish yellow.

DISTRIBUTION: Sumatra, Java, S. Mariana Is., Caroline Is.

S. MARIANA IS. SAIPAN: Female, Chalan Kanoa, at light, Jan. 1949, Maehler.

PALAU. BABELTHUAP: Four females, six males, Ngaremlengui, at light, June 1957, Sabrosky; two females, six males, Ngiwal, at light, June 1957, Sabrosky; three females, Netkeng, Imeliik, at light, June 1957, Sabrosky; female, Ngerehelong Pen., Dec. 1947, Dybas; female, male, Ngerehelong Pen., at light, May 1957, Sabrosky. KOROR: Female, light trap, Oct. 1952, Beardsley.

YAP. YAP: 25 females, two males, Hill behind Yaptown, 50 m., light trap, Nov.-Dec. 1952, Gressitt; six females, Kolonia, at light, June 1957, Sabrosky.

TRUK. WENA (Moen): Two females, Mt. Chukumong, 50 m., light trap, Dec. 1952, Gressitt.

The above description differs somewhat from that of Johannsen in the value of AR and the relative lengths of the male palpal segments, but these differences are thought to be individual. The female antenna was described as six-segmented by Johannsen; however he may have considered that the deep constriction of the fifth segment was a suture that divided the segment in two.

79. Polypedilum (Pentapedilum) esakii (Tokunaga). (Figure 16, *f*.)
Pentapedilum esakii Tokunaga, 1940, Philippine Jour. Sci. **71**: 222.

Small yellow and brown species, thorax with four distinct brown scutal vittae on yellow ground color, legs mainly yellow, but apices of femora and entire tibiae pale brown; AR 0.48-0.51; apical segment of male antenna subequal to preceding five or six segments combined, female antenna five-segmented; scutellum with 12 to 14 bristles along caudal margin; LR about 1.34 in male, 1.64 in female; wing with anal lobe slightly developed, macrotrichia rather densely spread all over surface, costa ending distinctly far before wing tip.

Male: Body about 2.02-2.08 mm. long; wing 1.25-1.34 mm. by 0.36-0.39 mm. Head brown, with mouthparts pale brown, eyes separated by one-third of length of eye or five facets; palp pale brown, with five segments in RL of 8: 10: 28.5: 32.5: 39.5; antenna entirely brown, 14-segmented, last segment subequal to preceding five or six segments taken together, AR about 0.48-0.51. Thorax mainly yellow, scutum with four distinct brown vittae, postscutellum brown on caudal two-thirds, sternal side pale brownish yellow, scutellum with 14 bristles along caudal margin and six to nine smaller accessory setae on anterior part. Legs mainly yellow, but femoral distal parts and entire tibiae pale brown, fore tibial scale without apical spine, mid and hind tibiae each with two combs separated and single slender spur, pulvilli large, LR 1.34, RL-FT about 42.8: 32.5, RL of fore tarsal segments 46: 25.5: 14: 14: 7. Wing with anal lobe slightly developed, anterior veins very pale brown, macrotrichia rather densely spread on entire surface and bare areas along veins narrow, squama with five to seven marginal setae, fMCu just beyond r-m, costa ending far before wing tip but beyond tip M_{3+4}, R_1 and R_{4+5} extending very closely to each other, RL-V about 34: 26.5: 48.5: 43. Halter pale brown. Abdomen pale brown; hypopygium (fig. 16, *f*) brown, with anal point small, ending far before tip of ventral appendage, style stout, and rather pointed apically, dorsal appendage rather stout, with three basal setae, apical projection arcuate, blunt at tip, with single long bristle far before tip, ventral appendage with five to seven curved bristles besides single long apical setae.

Female: Body length about 1.61 (1.97-1.95) mm.; wings 1.18 (1.13-1.29) mm. by 0.41 (0.38-0.44) mm. Very similar to male, with usual sexual differences. Head with eyes separated above by one-fourth length of eye; palp five-segmented (about 9: 10: 27: 27.5: 35); antenna with scape yellow, flagellum brown, five-segmented (13.5: 28: 16: 17: 12+25.5). Postscutellum uniformly fuscus in paratype, scutellum less setigerous than in male and usually without accessory setae. Leg with RL-FT about 38.6: 27.3, LR about 1.64. Wing with macrotrichia densely spread and bare areas along veins almost absent, RL-V about 31: 26.3: 47.8: 36.3, squama with one to four marginal setae. Halter pale brown, but rarely fuscus. Abdomen yellow, caudal end pale brownish yellow, cerci yellow.

DISTRIBUTION: S. Mariana Is., Caroline Is.

S. MARIANA IS. GUAM: Female, five males, Mt. Lamlam, Oct. 1952, Krauss; male, Mt. Lamlam, 400 m., Nov. 1952, Gressitt; two females, Nimitz Hill, May 1956, Clagg; two females, Piti, Nov. 1936, Swezey; female, at light, July 12, 1938, Oakley.

This species is very closely allied to *P. nodosum,* but more brownish, the scutum is provided with distinct vittae, AR is slightly smaller, tarsal segments 3 and 4 of male are subequal in length, and there are differences in the male hypopygium. In my original description of females from Kusaie Island, the antennal segmentation and LR were wrongly described.

80. Polypedilum (Pentapedilum) elongatus Tokunaga, n. sp. (fig. 16, *c*).

Small species; thoracic color different in the sexes with male mainly brownish, female yellowish, legs, wings and abdomen very pale; AR about 0.74-0.88, female antenna 5-segmented; scutellum without accessory small setae; LR about 1.8-2.02 in male, 1.4-1.52 in female; wing with rather sparse macrotrichia, bare areas along veins broad and distinct, R_1 and R_{4+5} distinctly divergent.

Male: Body 1.75 (1.56-1.95) mm. long; wings 1.04 (0.96-1.11) mm. by 0.29 (0.26-0.3) mm. Head brown to yellowish brown, with mouthparts yellowish white, eyes widely separated above by about two-thirds length of eye; palp with five segments in RL of 7: 8: 14: 22: 31; antenna with scape brown or pale brown, flagellum and plumose hairs paler or yellowish, AR 0.82 (0.74-0.88). Thorax brownish, scutum with vittae brown and subconfluent, caudoscutal area yellowish, humeral area far paler, scutellum yellowish brown, postscutellum and sternum brown, pleural side yellow or yellowish pale brown, scutellum with four to nine bristles along caudal margin and without accessory small setae. Legs entirely pale yellow or pale brownish yellow, fore tibial scale round on apical margin, mid and hind tibiae each with single small spur and combs separated, pulvilli rather small and bifid, LR 1.88 (1.8-2.02), RL-FT 31: 18.5. Wing with anterior veins very pale brown, anal lobe almost absent, macrotrichia usually sparse and bare areas along veins very broad, but rarely macrotrichia only present on apical part of wing, squama with three to five marginal setae, fMCu under basal one-fourth to one-half of R_1, costa ending at tip of wing, R_{4+5} distinctly divergent from R_1 and arcuate, RL-V about 13: 19.7: 42.7: 43.3. Halter very pale brown or white. Abdomen pale brown or pale yellow; hypopygium (fig. 16, *c*) pale brown, with anal point slender, extending beyond ventral appendage, style elongate, with setae on apical two-thirds of mesal side, dorsal appendage very slender, arcuate and with single seta on sub-basal part, dorsal appendage stout, with 7 to 10 simple and bifid curved bristles besides a single long apical bristle.

Female: Body about 1.45 (1.39-1.56) mm. long; wings 0.95 (0.91-0.99) mm. by 0.3 (0.29-0.31) mm. Coloration and LR somewhat sexually different. Head pale brownish yellow; palp five-segmented (6.3: 8: 14:20.3: 30.3); antenna five-segmented (9: 23.5: 15.5: 17.3: 8.3+20.8). Thorax entirely yellowish white, LR 1.48 (1.4-1.52), RL-FT 31: 20.3. Wing with anterior veins pale yellow, macrotrichia sparsely spread over surface, bare areas along veins broad and distinct, squama with four to five marginal setae, fMCu slightly beyond r-m, R_{4+5} divergent from R_1, apically curved strongly and reaching wing tip, RL-V 27.7: 17.7: 40.7: 31.7. Halter white. Abdomen entirely white.

Holotype, male (US 66572), Ton I., Truk, May 24, 1946, Townes. Allotype, female (US), Mt. Unibot, 32 m., Ton I., Truk, light trap, Truk, Jan. 1-4, 1953, Gressitt. Paratypes, three males, with holotype; two females with allotype; male, Mt. Chukumong, Wena I., Truk, 80 m., light trap, Dec. 28, 1952, Gressitt; male, Wena I., Truk, July 31, 1946, Townes; female, Netutu, Ton I., Truk, Apr. 7, 1949, Potts.

Other specimens. Truk. Wena (Moen): Male, Mt. Chukumong, light trap, Dec. 28, 1952, Gressitt; six males, July 31, 1946, Townes. Ton I.: Two males with allotype.

DISTRIBUTION: Caroline Is. (Truk).

This is closely allied to *P. convexum* but differs as follows: AR is far less than 1.0, LR usually less than 2.0, fore tibial scale quite round on apical margin, male hypopygium with anal point and style far more slender, dorsal appendage not setigerous basally, ventral appendage more setigerous apically.

81. Polypedilum (Pentapedilum) palauensis Tokunaga, n. sp. (fig. 16, *d, e*).

Minute pale-brown species, scutum with ill-defined brownish vittae; wings with macrotrichia very sparse, vein R_1 and R_{4+5} broadly divergent; AR 0.69 (0.55-0.78); LR 2.06-2.5.

Male: Body about 1.36 mm. long; wings about 0.94 (0.92-0.96) mm. by 0.28 (0.27-0.29) mm. Head pale brown, with mouthparts yellowish pale brown; palp with five segments in RL of 7: 8.5: 15: 21.5: 32.5; antenna with scape yellowish brown, flagellum and plumose hairs brown, last segments subequal to preceding five to six segments taken together, AR 0.69 (0.55-0.78). Thorax entirely pale brown or scutum with three brown, ill-defined vittae, scutellum with only four bristles. Leg pale brownish yellow, fore tibial scale subtriangular, but not pointed apically, mid and hind tibiae each with combs separated and spur single, pulvilli small, LR about 2.5, RL-FT about 34.3: 17.1. Wing with macrotrichia very sparse, spread only along caudal and apical margin and on furrow above M_{3+4} or only on caudal parts of apical marginal areas of cells R_5 and M_2, anal lobe quite absent, squama with two to three marginal setae, fMCu under basal one-fourth to one-half of R_1, R_1 and R_{4+5} widely divergent, R_{4+5} arcuate on apical one-third, costa ending at wing tip, RL-V 29: 16.7: 36: 35. Halter pale brown. Abdomen yellowish brown, hypopygium (fig. 16, *d*) pale brown, with anal point very slender and curved ventrad apically, coxite and style strongly curved, being convex laterad, style very slender, dorsal appendage long, strongly curved preapically and with single bristle on curved part, ventral appendage rather slender, reaching tip of anal point, with six to eight curved bristles and single long bristle at apical one-third.

Female: Body 1.13 (1.07-1.17) mm. long; wings 0.9 (0.85-0.95) mm. by 0.29 (0.27-0.31) mm. Generally pale brownish yellow, scutal vittae pale brown and indistinct, legs pale brown, but trochanters and basal one-half or one-third of femora white. Eyes separated above by one-third to one-fourth length of eye; palp five-segmented (7: 8: 13.7: 21: 28.2); antennae missing. LR about 2.09 (2.06-2.13), RL-FT about 32: 17.3. Wing (fig. 16, *e*) with macrotrichia sparse, only along apical and anal margin, squama with one or two marginal setae, fMCu slightly beyond r-m, RL-V about 26.7: 16: 37.3: 31. Halter yellow or pale brown. Abdomen yellowish pale brown, cerci yellowish white.

Holotype, male (US 66573), Koror, Koror I., Palau, at light, Apr. 29, 1957, Sabrosky. Allotype, female (US), Ngaremlengui, Babelthuap I., Palau, at light, June 1, 1957, Sabrosky. Paratypes, female, male, same as allotype, June 1, 3, 1957, Sabrosky; male, Ulimang, Babelthuap I., Palau, Dec. 9, 1947, Dybas; female, male, at light, Netkeng, Imeliik, Babelthuap I., Palau, at light, July 5 and 6, 1957, Sabrosky.

DISTRIBUTION: Caroline Is. (Palau).

This is closely allied to *trukensis,* both species being minute, pale brown, and having similar wing venation and value of AR, but the two species may be rather easily distinguished in the male by the difference of the male hypopygia and in the female only by the difference of LR.

82. Polypedilum (Pentapedilum) trukensis (Tokunaga).

Pentapedilum trukensis Tokunaga, 1940, Philippine Jour. Sci. **71**: 223.

Male: Wings about 1.05 mm. by 0.29-0.28 mm. AR about 0.8 (0.7-0.86). Scutellum with four to seven bristles along caudal margin and without small accessory setae. Some specimens with tibiae uniformly more brownish than other segments, fore tibial scale round on apex, mid and hind tibiae each with combs separated and single spur, RL-FT about 35.5: 21. Wing with veins pale brown, fMCu far beyond r-m, R_1 and

R_{4+5} distinctly divergent, anal lobe almost absent, RL-V about 35: 20: 40: 40, macrotrichia variable in development, when well-developed, trichia are rather densely spread almost all over surface, but bare areas along veins distinct. Hypopygium: Dorsal appendage usually with single bristle on shoulder part besides small, beaklike projection of round, pubescent apex, ventral appendage usually with five to eight stout bristles on apical head besides single long apical bristle.

Female: Body about 1.25 mm. long; wings about 0.95 mm. by 0.29 mm. Head pale brown, with eyes separated by one-third length of eye; palp five-segmented (5: 7: 12: 18: 28); antenna with scape yellow, flagellum pale brown, distal segments broken off. Thorax extensively pale brown, but scutellum yellowish and usually with four bristles. Legs pale brown, middle tibial spur vestigial, differing from male, pulvilli small, distinctly bifid, LR about 1.68, RL-FT about 31: 19. Wing with macrotrichia sparse in one specimen differing from allotype, only several along distal part of M_{1+2} in cell M_1, three on caudal corner of distal part of cell M_2, about 15 on distal two-thirds of M_{1+2} and four on distal one-fourth of M_{3+4}; squama with only single marginal seta, RL-V about 30: 16: 36: 35.

DISTRIBUTION: Caroline Is.

PALAU. BABELTHUAP: Female, Ngaremlengui, at light, June 1957, Sabrosky.

TRUK. WENA (Moen): Male, Mt. Chukumong, 150 m., light trap, Dec. 1952, Gressitt.

As noted in the above description the development of the macrotrichia of the wings of the both sexes is widely variable. Further observations on this new material supplement and correct the original description.

Tribe **Tanytarsini**

Synonym: Calopsectrini.

Similar to Chironomini, differing as follows (except in *Pontomyia*): Wing with macrotrichia of membrane at least on apical part (rarely quite absent), cross vein r-m parallel to and practically continuous with R_{4+5}, squama completely bare, and male hypopygium with a pair of accessory appendages (inferior) in addition to dorsal and ventral appendages.

KEY TO GENERA OF TANYTARSINI

1. Eyes thickly pubescent 2
   Eyes quite bare 3
2(1). Wings normal; fresh water genus .... **Zavrelia***
   Wings elongate, subtriangular, and oarlike; marine genus .... **Pontomyia**
3(1). Fore tibia with comblike structure at tip .... **Goetghebueria***
   Fore tibia without comblike structure at tip 4
4(3). Middle and hind tibial combs composed of separated free spinules .... **Yuasaiella***
   Middle and hind tibial combs composed of basally fused spinules 5
5(4). Middle and hind tibial combs without spurs .... **Micropsectra*** and **Lauterbornia***
   Middle and hind tibial combs with at least single spur 6
6(5). Middle and hind combs quite confluent .... **Ditanytarsus*** and **Lundstroemia***
   Middle and hind combs separated .... **Tanytarsus**

* Not recorded from Micronesia.

Genus **Tanytarsus** van der Wulp

Tanytarsus van der Wulp, 1874, Tijdschr. Ent. **17**: 134.—Goetghebuer, 1928, Faune France **18**: 124; 1938, IN Lindner, Flieg. Palaearkt. Reg. **13**, c: 105.—Freeman, 1958, British Mus. (N.H.), Ent. Bull. **6**: 331.

Tanytarsus subgenus *Tanytarsus,* Edwards, 1929, Ent. Soc. London, Trans. **77**: 409.

Stempellina Bause, 1913, Archiv Hydrobiol. Suppl. **2**: 120.—Goetghebuer, 1928, Faune France **18**: 120; 1938, IN Lindner, Flieg. Palaearkt. **13**, c: 96. —Freeman, 1958, British Mus. (N.H.), Ent. Bull. **6**: 352.

Tanytarsus subgenus *Stempellina,* Edwards, 1929, Ent. Soc. London, Trans. **77**: 419.

Eyes bare; frontal tubercles almost always absent, rarely present and then very small; antennae of male 11- to 14-segmented, of female five- to seven-segmented. Fore tibial scale slender, spinelike and sharply pointed; middle and hind tibial combs at least narrowly separated ventrally, occupying at most half circumference of tibiae, usually both with single spur, but inner spur often reduced and sometimes quite absent. Wing membrane with variable number of macrotrichia, anal lobe usually reduced in various extent, squama quite bare, R_{4+5} ending on costa between level of tip of M_{3+4} and wing tip. Male hypopygium with three pairs of appendages on coxites.

Aquatic and often marine in habitat.

Key to Subgenera of Tanytarsus

1. Middle and hind tibial combs with only one spur, inner combs unarmed............ ....**Stempellina**
   Middle and hind tibial combs with two spurs.. 2
2. Pulvilli present and fully half as long as claws..............................**Calopsectra***
   Pulvilli absent or very small.. 3
3. Styles of male hypopygium contracted at apex or for apical half......**Rheotanytarsus***
   Styles of male hypopygium evenly pointed or round at apex....................**Tanytarsus**

* Not recorded from Micronesia.

Subgenus **Tanytarsus** van der Wulp

Tanytarsus van der Wulp, 1874, Tijdschr. Ent. **17**: 134.—Freeman, 1958, British Mus. (N.H.), Ent. Bull. **4**: 332.

Tanytarsus subgenus *Tanytarsus,* Goetghebuer, 1928, Faune France **18**: 129; 1938, IN Lindner Flieg. Palaearkt. Reg. **13**, c: 105.

Tanytarsus subgenus *Tanytarsus,* Groups A, D, E and F, Edwards, 1929, Ent. Soc. London, Trans. **77**: 410, 413, 417, 418.

Cladotanytarsus Kieffer, 1922, Soc. Sci. Bruxelles Mém., Ann. **42**: 100.

Tanytarsus subgenus *Cladotanytarsus,* Goetghebuer, 1938, IN Lindner, Flieg. Palaearkt. Reg. **13**, c: 133.—Freeman, 1958, British Mus. (N.H.), Ent. Bull. **4**: 348.

Combs of middle and hind tibia at least narrowly separated ventrally, occupying at most half circumference of tibia; both combs always carrying single spur, spur of outer comb always distinct and long, but of inner comb shorter, more slender; pulvilli absent or highly reduced. Antennae of male 14- or rarely 13-segmented, of female five- to seven-segmented. Frontal tubercles present or absent. Wings with variable amount of macrotrichia on membrane; R_{4+5} ending above or beyond level of tip of M_{3+4}, anal lobe more or less developed, but occasionally highly reduced, styles of male hypopygium not abruptly narrowed apically; anal point present or absent.

The females of *halophilae, magnihamatus, esakii, maritimus, latiforceps* and *dybasi* (*maritimus*-group) are inseparable and were taken at the following localities:

PALAU. PELELIU: 675 females, light trap, May 1957, Sabrosky.

YAP. RUMUNG: 148 females, at light, June 1957, Sabrosky; Tomil Distr.: 115 females, at light, July 1950, Goss.

KUSAIE. MUTUNLIK: 12 females, light trap, Jan. 1953, Gressitt; five females, at light, Jan. 1953, Clarke; five females, at light, Mar. 1953, Clarke.

Cladotanytarsus is often separated from *Tanytarsus* (sens. str.) by the presence of branched hairs on the inferior appendage of the male hypopygium, the distribution of the macrotrichia on the male wings and the value of the LR. These characters, however, seem to be specific, rather than subgeneric, since many species intermediate between these two subgenera are known. I will treat them as a single subgenus, *Tanytarsus,* contrary to the opinions of Kieffer, Goetghebuer, and Freeman.

The species of this subgenus are small to minute and difficult to distinguish from each other; the only reliable character is the structure of the male hypopygium. The separation of the minute female specimens is not easy, especially as they are subject to considerable variation. The females of several Micronesian species, which have the elongate cerci and are supposed to be marine in habitat, are all minute and very similar to each other and some are almost impossible to identify unless examined under high magnification.

KEY TO MICRONESIAN SPECIES OF SUBGENUS TANYTARSUS

MALES

1. Anal point of hypopygium well-formed, drumstick-like, needlelike or platelike 2
   Anal point of hypopygium absent or minute and vestigial 10

2(1). Anal point with non-setigerous dots well-developed 3
   Anal point bare or setigerous and without dots 4

3(2). Anal point oblongate at tip, inferior appendage of hypopygium clavate and crowned with only simple setae; AR about 0.45 .... **83. ovatus**
   Anal point flat and round; inferior appendage of hypopygium small, crowned with lamellae and simple setae; AR about 0.86-0.93 .... **84. boninensis**

4(2). Anal point platelike 5
   Anal point elongate and usually somewhat tapered 8

5(4). Anal point transverse along caudal margin of tergite............**85. lamnicaudus**
Anal point subtriangular or suboval............ 6
6(5). Inferior appendage with very long hairs, extending beyond ventral appendage; AR about 0.18-0.21............**86. dybasi**
Inferior appendage only pubescent or with short hairs; AR larger than 0.2......7
7(6). Ventral appendage with three or four spatulate bristles besides simple bristles; inferior appendage pubescent apically; AR about 0.21-0.23............**87. halophilae**
Ventral appendage with only simple setae or bristles; inferior appendage with strong apical spines and normal preapical hairs; AR about 0.39-0.4............**88. ponapensis**
8(4). Anal point clavate apically; LR about 2.29-2.55; scutum with three brown vittae............**89. simplex**
Anal point tapered apically; LR less than 2.0; scutum uniformly very pale, without definite vittae............ 9
9(8). Inferior appendage of hypopygium long, as long as ventral appendage............**90. pelagicus**
Inferior appendage of hypopygium short, far smaller than ventral appendage............**91. insulicolus**
10(1). AR larger than 0.5............11
AR smaller than 0.5............13
11(10). Inferior appendage large, almost as large as ventral appendage............**92. magnihamatus**
Inferior appendage small, far shorter than ventral appendage............12
12(11). Style of hypopygium elongate-oval in lateral aspect; inferior appendage with slender hairs............**93. maritimus**
Style of hypopygium subtriangular in lateral aspect, projected dorsad at base part; inferior appendage minutely pubescent apically............**94. latiforceps**
13(10). Dorsal appendage of hypopygium bilobate............**95. brachyurus**
Dorsal appendage of hypopygium trilobate............14
14(13). AR about 0.18; three lobes of dorsal appendage equally blunt at apices............**96. tricuspis**
AR about 0.37-0.43; three lobes of dorsal appendage unequal in shape at apices............**97. esakii**

FEMALES

1. Cercus short, earlike, subtriangular, subrectangular, subrhombic or subspherical and far shorter than twice width............ 2
Cercus elongate, longer than twice basal width (*maritimus*-group)............ 8
2(1). Antennae six-segmented............ 3
Antennae five-segmented 5
3(2). LR about 2.25-2.55............**89. simplex**
LR less than 2.0............ 4
4(3). Wing with macrotrichia of basal part of cell M_2 before r-m arranged in only 2 lines............**91. insulicolus**
Wing with macrotrichia of basal part of cell M_2 before r-m more densely spread ....**90. pelagicus**
5(2). Frontal tubercles of head absent............**85. lamnicaudus**
Frontal tubercles of head present............ 6
6(5). LR smaller than 2.0............**84. boninensis**
LR larger than 2.0............ 7
7(6). Wing cuneiform, with macrotrichia very sparsely spread............**88. ponapensis**
Wing not cuneiform, with macrotrichia moderately dense............**83. ovatus**

8(1). Cercus very slender, ribbonlike; LR about 1.32-1.46 .... **86. dybasi**
Cercus gradually tapered caudad, somewhat spearlike; LR larger than 1.5 9
9(8). Wing vein R_{4+5} longer than 2.5 times R_1 .... **94. latiforceps**
Wing vein R_{4+5} usually shorter than 2.5 times R_1 10
10(9). Subgenital sternite usually with four to six long apical marginal setae 11
Subgenital sternite usually with eight or more long apical marginal setae 12
11(10). LR about 1.75-1.98; subgenital sternite usually with four or five long apical setae .... **95. brachyurus**
LR about 1.7-1.72; subgenital sternite usually with six long apical setae .... **97. esakii**
12(10). R_{4+5} about 2.4-2.5 times R_1 .... **93. maritimus**
R_{4+5} about 2.1-2.3 times R_1 13
13(12). LR less than 1.8 .... **87. halophilae**
LR larger than 1.8 .... **92. magnihamatus**

83. **Tanytarsus (Tanytarsus) ovatus** Johannsen (fig. 17, *a, b*).

Tanytarsus ovatus Johannsen, 1932, Archiv Hydrobiol. Suppl. 9, Tropische Binnengewässer **3**: 545.

Small yellowish-white species, with frontal tubercles small, AR 0.45, scutum with three pale-brown vittae, postscutellum pale brown, wing slender, sparsely hairy.

Male: Body about 1.59 mm. long; wings 1.07 mm. by 0.3 mm. Head yellowish white, with eyes separated above by one-third width of head, frontal tubercles small and slender; antenna with scape yellow, flagellum and plumose hairs pale brown, last segment subequal to preceding five segments combined, AR about 0.45. Thorax with three scutal vittae and postscutellum pale brown, scutellum with four bristles. Leg yellowish white, broadly pale brown on femoral and fore tibial ends, tibial combs separated and spurs unequal. Wings (fig. 17, *a*) slender, scantily setigerous, bare areas along veins very broad, fMCu distinctly beyond r-m, RL-V 28: 24: 40: 36. Abdomen yellowish white; hypopygium (fig. 17, *b*) with anal point small, rather round at tip and with three dots on dorsal side, style somewhat pointed, dorsal appendage bilobate, dorsal lobe oval and poorly setigerous, ventral lobe clawlike, ventral appendage with eight small apical bristles and a few small preapical setae, inferior appendage small, clavate and with slender apical brushlike setae.

DISTRIBUTION: Java, Caroline Is.

PALAU. BABELTHUAP: Male, Ngarsung, Airai, at light, May 1957, Sabrosky.

The types from Java are somewhat larger than the present specimen, but other specific characters are identical, except for a slight difference in the dorsal appendage of the male hypopygium.

84. **Tanytarsus (Tanytarsus) boninensis** Tokunaga, n. sp. (fig. 17, *c*).

Medium-sized, yellowish-white species with distinct frontal tubercles; AR 0.83-0.93 and female antenna five-segmented; LR 2.48 in male and 1.68 in female, tibial combs with two spurs; wing macrotrichia rather sparse in male and dense in female, bare areas along veins rather broad; scutellum with several setae along caudal margin and a few accessory small setae on anterior part.

Male: Body 2.27 (1.94-2.67) mm. long; wings 1.41 (1.3-1.51) mm. by 0.4 (0.39-0.42) mm. Head yellow, with mouthparts paler, eyes very widely separated above by two-thirds to three-fourths length of eye, frontal tubercles conical, as long as two facets

combined; palp five-segmented (11: 12.3: 36.7: 37: 44); AR 0.87 (0.83-0.93). Thorax entirely yellow, scutellum with seven setae along caudal margin and two to three accessory small setae on anterior part. Legs entirely yellow, tibial combs separated, tibial spurs almost straight and, in middle leg, distinctly unequal, pulvilli minute, LR 2.48, RL-FT 59.3: 30.8. Wing with anterior veins very pale, macrotrichia rather sparsely spread all over surface, bare areas along veins broad, anal lobe almost absent, fMCu slightly beyond r-m or under basal one-third of R_1, RL-V 41.3: 29.3: 54: 48. Halter yellowish white. Abdomen entirely yellow; hypopygium (fig. 17, *c*) yellow, anal point with basal part broad, almost square and blunt on caudal lateral corners,

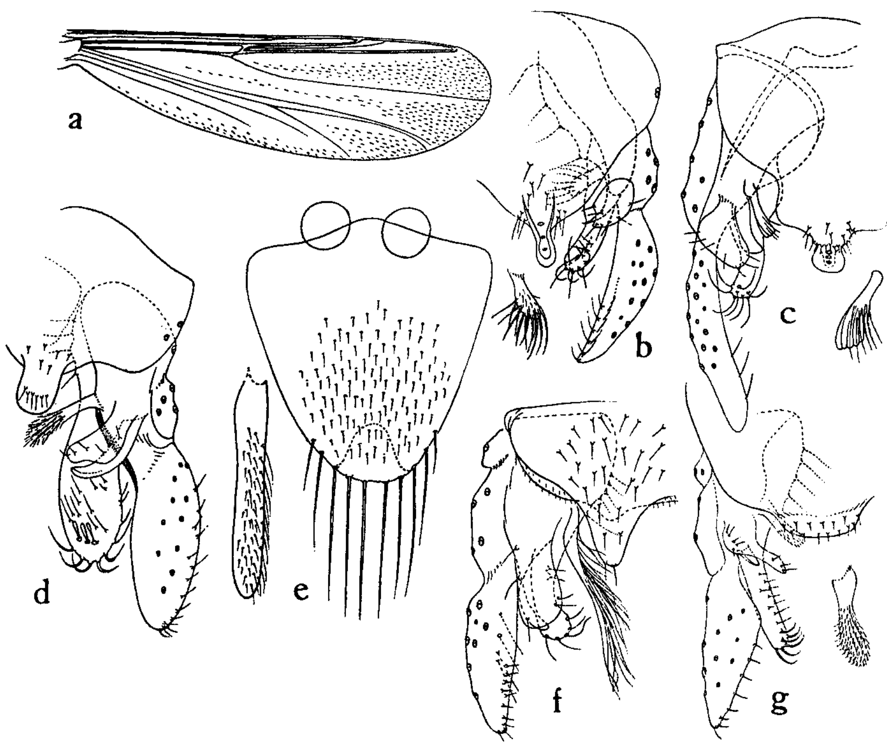


FIGURE 17.—*Tanytarsus* (s. str.): **a, b,** *T. ovatus,* male wing and hypopygium; **c,** *T. boninensis,* male hypopygium; **d,** *T. halophilae,* male hypopygium; **e, f,** *T. dybasi,* female subgenital sternite and cercus, and male hypopygium; **g,** *T. lamnicaudus,* male hypopygium.

median caudal projection round or oval and with a few dots, basal part of caudal projection with many minute spinelike setae, style long and slender, dorsal appendage bilobate, dorsal lobe poorly setigerous and oval, ventral lobe fingerlike, as long as dorsal, sometimes slightly swollen at tip, ventral appendage rather small, with 6 to 10 apical bristles, inferior appendage very small and with a few lamellae and setae at apex.

Female: Body about 2.15 mm. long; wings 1.26-1.39 mm. by 0.43-0.46 mm. Generally as in male or paler. Palp with five segments about 11: 12.5: 33.5: 35.5: 45.

Antenna five-segmented (16: 24: 16: 18: 37.5), intermediate flagellar segments subfusiform, scutellum usually with more setae than in male. LR about 1.68, RL-FT 58: 29.5. Wing macrotrichia rather densely spread all over surface, but bare areas along veins broad, fMCu just beyond r-m or under basal one-fourth of R_1, RL-V 35.5: 24.5: 53.5: 40. Abdomen and cerci yellow.

Holotype, male (BISHOP 3376), Futami-ko, Chichi Jima, Bonin Is., May 10, 1956, Clagg. Allotype, female (BISHOP) with holotype. Paratypes, female, three males, same locality as for holotype, May 10 and 11, 1956, Clagg; male, Nimitz Hill, Guam, May 4, 1956, Clagg.

Other specimens. Bonin Is.: Female and 23 males with holotype.

DISTRIBUTION: Bonin Is. (Chichi Jima), S. Mariana Is. (Guam).

This new species is similar to *T. ponapensis* in general appearance, but easily distinguished from it and other species by the highly specific characters of the male hypopygium and the well-developed frontal tubercles. It is unusual in that the values of LR are distinctly different in the two sexes.

85. Tanytarsus (Tanytarsus) lamnicaudus Tokunaga, n. sp. (fig. 17, *g*).

Tanytarsus sp. No. 1, Tokunaga, 1940, Philippine Jour. Sci. **71**: 225.

Tanytarsus sp. No. 2, Tokunaga, 1940, Ibid. **71**: 226.

Small, yellowish-white species, AR 0.49-0.52, scutum with 12 to 14 bristles along caudal margin and few accessory minute setae, LR 1.37-1.55, wing with anal lobe rather narrow in male, rather broad in female, macrotrichia sparse in male, dense in female.

Male: Body 2.23 (2.15-2.38) mm. long; wings 1.35 (1.3-1.4) mm. by 0.4 (0.37-0.42) mm. Head with vertex yellowish white with eyes separated above by more than width of eye, no frontal tubercles; palp five-segmented (10: 10: 33: 35: 60); antenna with scape yellow, flagellum and plumose hairs brown, last segment subequal to preceding six segments combined, AR 0.5 (0.49-0.52). Thorax yellowish white, no scutal vittae, scutellum with 12 to 14 bristles along caudal margin and one to two small accessory setae. Legs entirely yellowish white, but last tarsal segments slightly brownish, middle and hind tibial combs almost confluent and spurs unequal, LR about 1.5. Wing with anterior veins very pale brown, anal lobe rather narrow, anal angle round and very obtuse, macrotrichia rather sparsely spread almost all over surface, but bare areas along veins very broad, costa ending before wing tip, but far beyond tip of M_{3+4}, fMCu under origin of r-m or just beyond it, RL-V 40.8: 24.8: 46.3: 44.3. Halter white. Abdomen yellowish white; hypopygium (fig. 17, *g*) with anal point very broad, short, platelike around caudal margin of tergite and setigerous with minute setae, style slender, subfusiform in lateral aspect, dorsal appendage slightly swollen basally and with several setae, apically bilobate, one lobe straight and with few setae, other lobe minute and subtriangular, ventral appendage slender, with five to six apical bristles and several erect setae on apical four-fifths, inferior appendage rather broad, apically featherlike.

Female: Body 1.82 (1.74-1.92) mm. long; wings 1.22 (1.16-1.26) mm. by 0.44 (0.43-0.46) mm. Very similar to male with usual sexual differences. Distance between eyes wider than in male; five segments of palp in proportions of 11: 10.5: 28: 34: 57; antenna five-segmented (14.3: 26.7: 16.3: 16.7: 32.7), with scape yellow, following three segments white, last segment brown. LR 1.48 (1.37-1.55). Wing with anal lobe rather broad, macrotrichia thickly spread all over surface, RL-V 34.3: 23.5: 47.3: 37.3. Abdomen yellow or yellowish white, cerci white, subrhombic or subhexagonal, subgenital sternite round on caudal margin, with small semicircular caudal incision, no strong marginal bristles.

Holotype, male (US 66574), Rumung I., Yap, at light, May 17, 1957, Sabrosky. Allotype, female (US), Ulimang, Babelthuap I., Palau, Dec. 23, 1947, Dybas. Paratypes, five females and three males with holotype; five females, Melekeiok, Babelthuap I., Palau, May 22, 1957, Sabrosky; four females, two males, Ngaremlengui, Babelthuap I., Palau, at light, June 1 and 3, 1957, Sabrosky; two females, Ngerkabesang I., Palau, seashore, Nov. 16, 1947, Dybas; three females, male, Ngarabad, Koror I., Palau, May 17, 1947, Dybas; female, SW. Koror I., Palau, light trap, Dec. 18, 1952, Gressitt; female, Angaur I., Palau, Feb. 3, 1948, Dybas; male, Dugor, Weloy, Yap I., at light, June 14, 1957, Sabrosky; female, Kolonia, Yap I., at light, June 21, 1957, Sabrosky; female, Gachapar, Gagil Distr., Yap, at light, June 19, 1957, Sabrosky; female, Yap I., July-Aug. 1950, Goss; female, three males, Tonoas I., Truk, at light, 1949, Maehler; Mutunlik, Kusaie, five males, Jan. 23-24, 1953, 10 females, three males, Feb. 3 and 14, Mar. 3, 21 and 30, 1953, Clarke; male, Mwot, Kusaie, light trap, Apr. 10, 1953, Clarke.

Other specimens. Palau. Babelthuap I.: 18 females, male, Ngaremlengui, at light, June 3, 1957, Sabrosky; two females, Ngerehelong Pen., June 3, 1957, Sabrosky; 14 females, Melekeiok, at light, May 22, 1957, Sabrosky; female, Ulimang, Dec. 19, 1947, Dybas. Palau, Koror I.: Two females, SW. Koror I., 25 m., light trap, Dec. 14, 1952, Gressitt; 24 females, five males, Ngarabad, at light, May 17, 1957, Sabrosky. Yap. Yap I.: Female, Kanif, July 16, 1950, Goss. Rumung I.: 122 females, 17 males, at light, June 17, 1957, Sabrosky. Gagil-Tomil Distr.: Female, male, Tomil, July 8, 1950, Goss. Kusaie: Three females, Mutunlik, 22 m., light trap, Jan. 24 and 31, 1953, Gressitt; 32 females, male, Mutunlik, at light, Jan. 26, Feb. 6, 14 and 30, 1953, Clarke; male, Mwot, light trap, Apr. 10, 1953, Clark.

DISTRIBUTION: Caroline Is. (Palau, Yap, Truk, Kusaie).

The male of the present species is closely allied to *T. maritimus* and the female to a Japanese marine species *T. boodleae* Tokunaga. These allied species, however, distinctly differ in the following points: The male hypopygium of *maritimus* is provided with only vestigial subtriangular anal point and in the female of *boodlea* the second antennal segment is subequal in length to the ultimate, LR is usually larger than 1.5 and the wings have broader bare areas along veins unlike the present species. *Tanytarsus* spp. 1 and 2 are thought to be the females of *lamnicaudus*.

86. Tanytarsus (Tanytarsus) dybasi Tokunaga, n. sp. (fig. 17, *e, f*).

Minute yellowish-white or white species, somewhat allied to *halophilae, maritimus,* and other marine *Tanytarsus* species. AR 0.2, last antennal segment of male very small, only slightly longer than preceding two segments taken together, female antenna five-segmented; LR 1.38-1.44 in male and 1.25-1.46 in female; male wing with very sparse macrotrichia only along apical margin of wing, sometimes only on distal tip of wing, rarely additional trichia arranged in line above M_{1+2} and on furrow above stem of fMCu.

Male: Body 2.02 mm. long; wings 1.07-1.09 mm. by 0.34-0.36 mm. Head with eyes widely separated above as by one-third width of head; palp five-segmented (8.5:8.5: 22.5: 32.5: 48); antenna with AR 0.2 (0.19-0.21), last segment oblong and only slightly longer than preceding two segments put together, RL of distal five segments about 13.2: 12.5: 12: 12: 27. Thorax without scutal vittae, scutellum with two central bristles and two to three small setae on either lateral part. Legs with pulvilli small, tibial combs small and separated, tibial spurs unequal, LR 1.42 (1.38-1.44). Wing with anal lobe absent, anal cell narrow, costa ending before wing tip but far beyond tip of M_{3+4}, fMCu slightly beyond r-m, RL-V about 33.5: 16.5: 38: 37.5, macrotrichia present only on apical parts of cells R_5 and M_2 and sometimes on middle longitudinal line of R_5 and furrow above stem of fMCu. Halter white. Male hypopygium (fig. 17, *f*) with anal point blunt, spatulalike and scantily setigerous, style rather slender, dorsal appendage bilobate, dorsal lobe large, sparsely setigerous, round on apex, ventral lobe as long as dorsal, but slender and somewhat pointed, ventral appendage short, round at apex and with five to six small apical bristles, inferior appendage large, with very long hairs of brushlike part, extending far beyond ventral appendage.

Female: Body 1.43 mm. long; wings 0.96-1.05 mm. by 0.34-0.35 mm. Generally as in male with usual sexual differences. Head with distance between eyes two-fifths width of head; palp five-segmented (8: 7: 19: 26: 42); antenna five-segmented (8.7: 21.7: 12.8: 13.7: 25.5), intermediate flagellar segments with neck parts short, about one-third of segments. LR 1.37 (1.25-1.46). Wing with macrotrichia rather densely spread along marginal part, but very sparse at middle and bare areas along veins very broad, RL-V about 23: 18: 39: 29. Subgenital sternite elongate, tapered, bluntly pointed, with six to nine long bristles along caudal margin, cercus very long, tapelike and more than six times width (fig. 17, *e*).

Holotype, male (US 66575), Ulimang, Babelthuap I., Palau, Dec. 10, 1947, Dybas. Allotype, female (US) with holotype. Paratypes, three males, same locality as for holotype, Dec. 10 and 13, 1947, Dybas; two females, three males, Chalan Kanoa, Saipan I., light trap, Jan. 15, 1949, Maehler; male, near Sabana, Rota I., June 23, 1946, Townes; six males, Melekeiok, Babelthuap I., Palau, at light, May 22, 1957, Sabrosky; female, male, Angaur I., Palau, Feb. 3, 1948, Dybas; male, Peleliu I., Palau, at light, May 28, 1957, Sabrosky; five females, four males, Ngaiangl I., Ngaiangl Atoll, Palau, light trap, Dec. 15-16, 1952, Gressitt; female, same locality, at light, May 9, 1957, Sabrosky; female, male, Touhou I., Kapingamarangi Atoll, E. Carolines, July 17, 1954, Niering; female, 11 males, Rumung I., Yap, at light, June 17, 1957, Sabrosky; male, Pukusrik, Kusaie, 1 m., light trap, Apr. 2, 1953, Clarke; female, Mutunlik, Kusaie, light trap, Jan. 24, 1953, Gressitt.

Other specimens. Palau. Babelthuap I.: 29 females, 31 males, Ulimang, Dec. 10 and 13, 1947, Dybas; 154 females, 19 males, Ngaremlengui, at light, June 3, 1957, Sabrosky; six females, Ngiwal, light trap, 1 m., Dec. 16, 1952, Gressitt; two females, Melekeiok, at light, May 22, 1957, Sabrosky. Peleliu I.: Female, Apr. 23, 1936, Kondo; female, light trap, Dec. 22, 1952, Gressitt. Angaur I.: Female, Feb. 3, 1948, Dybas. Koror I.: Female, Entomology Laboratory, Koror, light trap, Dec. 5, 1952, Gressitt. Caroline Atolls: Six females, male, Touhou I., Kapingamarangi Atoll, July 10 and 17, 1954, Niering. Yap. Tomil Distr.: Female, two males, July 8, 1950, Goss. Kusaie: 15 females, 15 males, Mutunlik, light trap, Jan. 26 and 31, Feb. 6, 8 and 14,

Mar. 1, 30, 1953, Clarke; seven females, male, Mutunlik, Jan. 24, 25, 1953, Gressitt; 20 females, two males, Pukusrik, Apr. 3, 1953, Clarke.

DISTRIBUTION: S. Mariana Is. (Saipan, Rota), Caroline Is. (Palau, Yap, Kusaie, Kapingamarangi).

The male hypopygium of this species is quite different from the other Micronesian species, but the female is closely allied to the Japanese marine species *pontophilus* Tokunaga in the structure of the hypopygium. In the female of *pontophilus,* however, LR is about 1.5, the wings are more sparsely haired and the cerci are somewhat broader, unlike that of the new species.

87. Tanytarsus (Tanytarsus) halophilae Edwards (fig. 17, *d*).

Tanytarsus halophilae Edwards, 1926, Zool. Soc. London, Proc. **2**: 791; 1928, Insects of Samoa **6**(2): 63.—Tokunaga, 1940, Philippine Jour. Sci. **71**: 223.

Small pale yellow or pale brownish-yellow species; AR 0.21-0.25 and last segment of male antenna slightly shorter than preceding three segments taken together, female antenna five-segmented; thorax entirely pale, scutellum with usually eight setae along caudal margin; legs with tibial combs separated, two spurs unequal, pulvilli vestigial, LR 1.74-1.88 in male and 1.7-1.76 in female; wing macrotrichia in male rather sparsely spread at middle and densely on margin, in female densely spread all over surface; anal lobe somewhat reduced, fMCu slightly or just beyond r-m.

Male: Body 1.79-1.85 mm. long; wings 1.05-1.08 mm. by 0.35-0.36 mm. Head without any trace of frontal tubercles, with eyes separated above by about two-thirds to three-fifths length of eye; palp five-segmented (8.7: 8.7: 25: 30: 43.5); antenna with scape yellow, flagellum and plumose hairs pale brown, ultimate segment very short, shorter than preceding three taken together, AR 0.23 (0.21-0.25). Thorax entirely yellow, scutellum with eight, rarely seven, setae along caudal margin. Legs also entirely yellow, tibial combs separated, spurs unequal, pulvilli small, LR 1.81 (1.74-1.88), RL-FT 41.1: 26.9. Wing with anterior veins very pale yellow, anal lobe reduced, macrotrichia sparse on middle area and rather dense on marginal area, bare areas along veins broad, fMCu slightly beyond r-m, RL-V 31.5: 18.5: 38.5: 35. Halter white. Abdomen very pale; hypopygium (fig. 17, *d*) yellow, anal point oval, spatulate, with several minute bristles arranged in single line on preapical part and more similar setae scattered on basal part, style large and oval, dorsal appendage bilobate, one lobe subtriangular, one slender, both not sharply pointed and subequal in length, ventral appendage highly specific in possession of small spatulalike bristles on mesal side of apical part, inferior appendage small, apical half fissured into hyaline lamellae and each lamella fringed with very minute brown hairs.

Female: Body about 1.69 mm. long; wings about 1.16 mm. by 0.42 mm. Coloration and structures generally as in male. Head with palp five-segmented (9: 9: 25.5: 33: 52), antenna five-segmented (14: 25: 15.3: 16: 30.3), last segment with apical two-thirds fuscus, intermediate flagellar segments with neck parts slightly shorter than half of the segment. LR 1.7-1.76, RL-FT 43.9: 29.8. Wing macrotrichia densely spread all over surface, RL-V 30: 22: 47: 36. Abdomen with subgenital sternite elongate, tapered, truncate caudad and usually with eight strong bristles on caudal margin, cercus elongate, tapered and about 3.3 times as long as basal width.

DISTRIBUTION: Samoa, S. Mariana Is., Caroline Is., Marshall Is.

S. MARIANA IS. SAIPAN: Male, Chalan Kanoa, at light, Jan. 1949, Maehler.

PALAU. BABELTHUAP: Female, Ngaremlengui, at light, July 1957, Sabrosky.

YAP. Female, five males, Tomil Distr., June 1950, Goss.

CAROLINE ATOLLS. WOLEAI: Male, Falalis I., Sept. 1952, Krauss; male, Utagal I., Apr. 1952, Krauss. KAPINGAMARANGI: Two females, 19 males, Hare I., Aug. 1946, Townes; male, Touhou I., July 1954, Niering. NUKUORO: Female, six males, Nukuoro I., Aug. 1946, Townes. PINGELAP: Two males, at light, Jan. 1953, Gressitt.

TRUK. TRUK: Female, male, Pis I., June 1946, Townes. TON: Female, Netutu, Apr. 1949, Potts.

KUSAIE. 16 females, 38 males, Mutunlik, light trap, 16 m., Jan. 1953, Gressitt; 48 females, 31 males, Mutunlik, light trap, Jan. to Apr. 1953, Clarke; 11 males, Pukusrik, light trap, Apr. 1953, Clarke.

MARSHALL IS. LIKIEP: Female, male, Likiep I., Aug. 1946, Townes. AILINGLAPALAP: Three females, three males, Bikarej I., Aug. 1946, Townes. KILI: Three females, three males, Oct. 1953, Beardsley. ARNO: Male, Ine I., June 1950, La Rivers.

Edwards' original description and my 1940 redescription are corrected and supplemented here by observations on the more than 70 slide-mounted specimens from Micronesia. Edwards did not notice the details of the anal point and the ventral appendage of the male hypopygium which show the most distinctive specific characters, although he gave a drawing of the male hypopygium in ventral aspect.

88. Tanytarsus (Tanytarsus) ponapensis Tokunaga, n. sp. (fig. 18, *a*).

Small yellow species allied to *boninensis,* but rather easily identified by small value of AR, vestigial frontal tubercles and characteristic structure of male hypopygium. Frontal tubercles shorter than diameter of single facet, AR 0.39-0.4 and female antenna five-segmented; LR 2.82-2.91 in male and 3.1 in female; wing macrotrichia rather sparse in male and moderate in female, anal lobe absent; male hypopygium with anal point similar to that of *boninensis,* but median caudal projection without dots and with many small spinelike bristles.

Male: Body 1.63-1.82 mm. long; wings 0.99-1.07 mm. by 0.3-0.34 mm. Head with minute frontal tubercles, slightly shorter than diameter of facet, eyes widely separated by four-fifths length of eye; palp with five segments in RL of 9:9:23:28.5:46.5; antenna with scape yellow, flagellum and plumose hairs brown, AR 0.39-0.4. Thorax entirely yellow, scutellum with seven setae along caudal margin. Legs with coxae, trochanters, and femora yellow, tibiae and tarsi yellowish white, pulvilli rather large, tibial combs separated and with two distinctly unequal spurs, LR 2.82-2.91, RL-FT 39.5:17.3. Wing with macrotrichia rather sparsely spread all over surface, but bare areas along veins broad, anal lobe absent, fMCu under basal one-fifth to one-fourth of R_1, RL-V 27.7:21.3:40:33.7. Halter white. Abdomen entirely yellow; hypopygium (fig. 18, *a*) with anal point consisting of broad subsquare basal part and oblong spatulate caudal projection, which bears many small stiff but minute setae, style rather short, dorsal appendage bilobate, dorsal lobe oblong, somewhat pointed apically and scantily setigerous, ventral lobe conical or clawlike but far shorter than dorsal lobe, ventral appendage distinctly capitate, rather long, with 7 to 12 apical setae, inferior

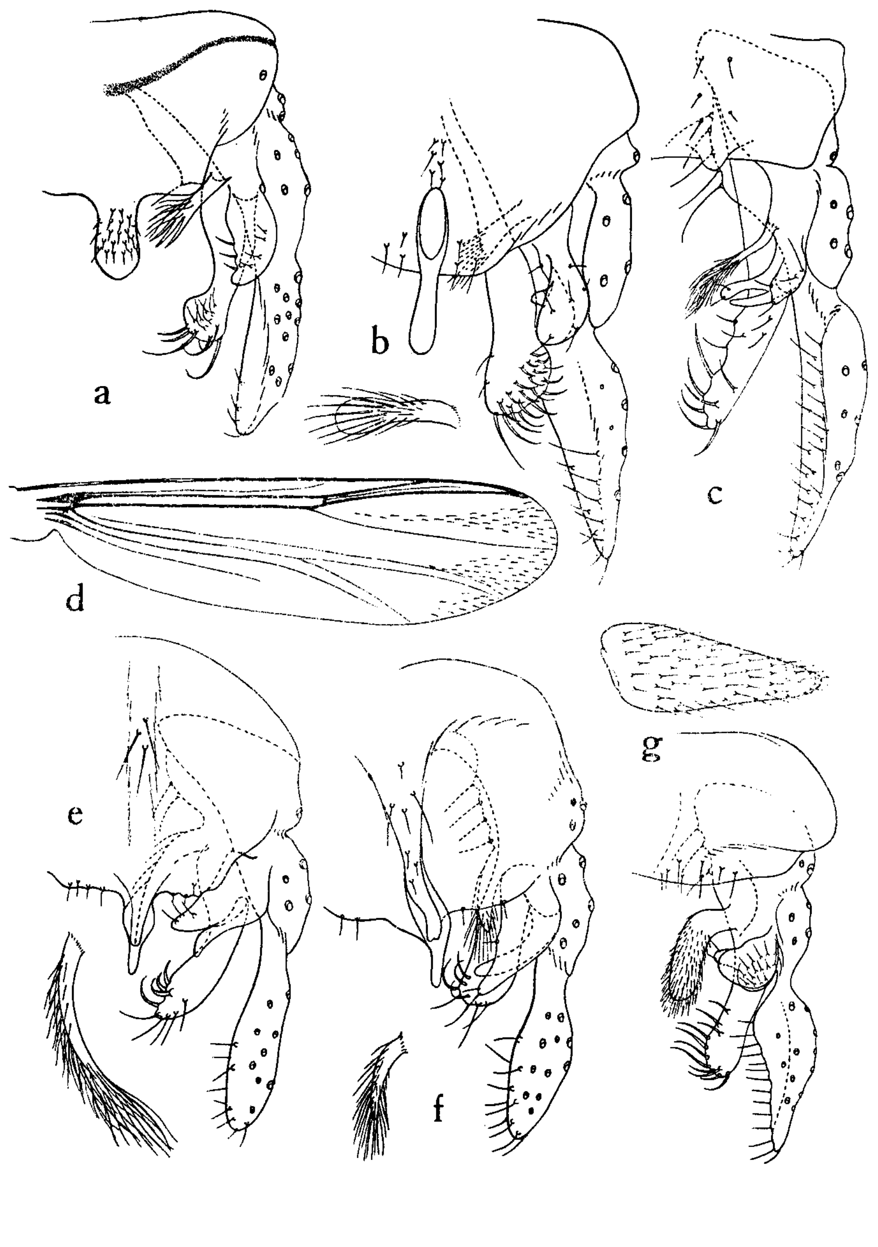


FIGURE 18.—*Tanytarsus* (s. str.). **a-c,** male hypopygia: *a, T. ponapensis; b, T. simplex; c, T. maritimus.* **d, e,** *T. pelagicus,* male wing and hypopygium. **f,** *T. insulicolus,* male hypopygium. **g,** *T. magnihamatus,* male hypopygium and female cercus.

appendage rather small, with three to four lanceolate lamellae and six to seven delicate hairs on apical part.

Female: Body 1.56-1.69 mm. long; wings 1.6 (1.56-1.69) mm. by 0.36 (0.33-0.39) mm. Coloration as in male with usual sexual differences. Five segments of palp about 9.5: 9.5: 32.5: 34.5: 47, in one paratype segments 3 and 4 fused abnormally; antenna with scape yellow, other segments pale brownish yellow, but sometimes apical three-fifths of last segment slightly fuscus, five segments in proportion of 12.5: 23: 15.5: 17.8: 34. Scutellum with variable number of setae (2 to 10). LR about 3.1, RL-FT 48.8: 22.5. Wing with macrotrichia usually moderately spread all over surface and bare areas along veins broad, but rarely trichia spread along marginal area and linearly arranged in cells R_5 and M_2, fMCu slightly beyond r-m or under basal one-fifth to one-sixth of R_1, RL-V 29: 25.3: 49: 33.7.

Holotype, male (BISHOP 3377), Mt. Temwetemwensekir, Ponape, light trap, 180 m., Jan. 19, 1953, Gressitt. Allotype, female (BISHOP), same locality as for holotype, Jan. 18, 1953, Gressitt. Paratypes, male with holotype; female, same locality as for holotype, Jan. 15, 1953, Gressitt; male, Ngaremeskang, Babelthuap I., Palau, light trap, 30 m., Dec. 24, 1952, Gressitt; male, Ngaremlengui, Babelthuap I., Palau, at light, June 3, 1957, Sabrosky; three females, Mt. Chukumong, Wena I., Truk, light trap, 80 m., Dec. 27-28, 1952 and Feb. 5, 1953, Gressitt.

Other specimens. Ponape: Two males with holotype. Truk: Female, Wena I., June 1, 1946, Townes; five females, male, Mt. Chukumong, Wena I., light trap, 80 m., Dec. 27 and 28, 1952, Gressitt.

DISTRIBUTION: Caroline Is. (Palau, Truk, Ponape).

This species is closely allied to *T. boninensis,* but the two species are easily identified by the distinct differences of the antennal segmentation and the male hypopygial structure. The females of these species are separated only by the different values of LR as shown in the key.

Several female specimens from Truk (Mt. Teroken, Moen I.), which are possibly *ponapensis,* differ from the type specimens in some points and probably represent a local variation or subspecies. The main differences of the Truk specimens are: five segments of antenna about 12.3: 21.7: 15.7: 18: 30, LR 2.23-2.35, RL-FT 49: 23.2, and RL-V 28.7: 20.7: 45.3: 33.7.

89. Tanytarsus (Tanytarsus) simplex Tokunaga, n. sp. (fig. 18, *b*).

Minute yellowish-brown species; scutal vittae, postscutellum, and knee parts of legs brown, abdomen with faint slender fuscus bands on posterior margins of tergites; AR 0.32 (0.28-0.38), female antenna six-segmented; LR 2.44 (2.26-2.55) in male and 2.41 (2.25-2.55) in female; wings cuneiform, with macrotrichia rather sparsely spread all over surface.

Male: Body length 1.75 (1.72-1.79) mm.; wings 1.17 (1.11-1.21) mm. by 0.33 (0.31-0.34) mm. Head yellowish brown, with eyes separated by one-fourth width of head; palp with five segments in RL of 7.3: 8: 23.3: 25.3: 30; antenna with scape yellow, flagellum and plumose hairs brown, 14-segmented, but often three to four distal segments subconfluent, last segment subequal to preceding four segments combined. Thorax yellowish white, but scutal vittae and postscutellum brown, scutellum with two median bristles and two small setae on either lateral part. Legs very pale

brown, with all knee parts and fore tibiae more brownish or fuscus, tibial combs separated and spurs equally small, pulvilli absent, LR 2.44 (2.26-2.55), FL-FT about 38: 16.8. Wings somewhat cuneiform, with anterior veins slightly fuscus, macrotrichia sparsely spread all over surface but bare areas along veins broad, costa ending above midway between tips of M_{1+2} and M_{3+4}, fMCu under middle of R_1, RL-V 26.3: 23.5: 48.5: 37.5. Halter white. Abdomen with faintly fuscus slender bands along caudal margins of tergites; hypopygium (fig. 18, *b*) pale brown, with anal point slightly clavate apically and slender, style rather pointed, dorsal appendage with dorsal lobe broad, slightly setigerous, ventral lobe minute and often indistinct, ventral appendage large, clavate, with 13 to 15 apical bristles, inferior appendage small, with hairs of brushlike part rather long and apical hyaline oval lobe, which is often indistinct.

Female: Body about 1.79 mm. long; wings 1.13 (1.07-1.2) mm. by 0.33 (0.33-0.34) mm. Generally as in male. Palp five-segmented (7: 9: 24.5: 25.5: 38), antenna six-segmented (12.5: 20: 13: 14.5: 12: 17), with scape yellow, other segments pale brown. Legs white, LR 2.41 (2.25-2.55). Wings with macrotrichia denser than in male, RL-V 24: 25: 50: 37. Abdomen yellowish brown, subgenital sternite broad, with shallow caudal incision, no strong caudal bristles, cercus small and discoidal.

Holotype, male (US 66576), Peleliu I., Palau, at light, May 28, 1957, Sabrosky. Allotype, female (US), Netkeng, Imeliik, Babelthuap I., Palau, at light, June 6, 1957, Sabrosky. Paratypes, male with holotype; two females with allotype; six females, seven males, Ngaremlengui, Babelthuap I., Palau, at light, June 1 and 3, 1957, Sabrosky; female, seven males, Ngiwal, Babelthuap I., Palau, May 20-21, 1957, Sabrosky; male, same locality, at light, Dec. 16, 1952, Gressitt; female, two males, Melekeiok, Babelthuap I., Palau, at light, May 22, 1957, Sabrosky; male, Mt. Nahnalaud, NW. slope, Ponape, Mar. 17, 1948, Dybas.

Other specimens. Palau. Babelthuap I.: Female, 25 males, Ngiwal, swarming in sun over small jungle stream, May 21, 1957, Sabrosky; 38 females, 28 males, Ngaremlengui, at light, June 1 and 3, 1957, Sabrosky; female, five males, Melekeiok, at light, May 22, 1957, Sabrosky.

DISTRIBUTION: Caroline Is. (Palau, Ponape).

This is somewhat allied to a marine species, *T. pelagicus* Tokunaga, in coloration and other structures. In that species, however, AR is far larger, 0.5, LR is far smaller than 2.0, the wings are not distinctly cuneiform, the male wing is provided with very sparse macrotrichia, the male hypopygium bears anal point more pointed, the dorsal appendage is distinctly bilobate, and the inferior appendage is far longer.

90. **Tanytarsus (Tanytarsus) pelagicus** Tokunaga (fig. 18, *d, e*).

Tanytarsus pelagicus Tokunaga, 1933, Philippine Jour. Sci. **51**: 364.

Small yellow or yellowish pale brown species; thorax with scutal vittae, postscutellum and sternum brown, fore leg with apical part of femur and entire length of tibia somewhat more brownish, in some specimens all knee parts broadly brownish. AR 0.62-0.68 and female antenna six-segmented, no frontal tubercles, LR 1.26-1.35, male wing with macrotrichia only on apical part, female with rather dense macrotrichia all over surface.

Male: Body 1.82-1.95 mm. long; wings 1.04-1.11 mm. by 0.31 mm. Head with vertex yellowish brown, frons and mouthparts yellow, eyes separated above by one-

third length of eye; palp five-segmented (6.5: 10: 28: 28: 38.5); antenna with scape yellowish brown, flagellum and plumose hairs brown, AR 0.62-0.68. Thorax yellow, but scutum with brown vittae subconfluent, caudoscutal area pale brown, humeral areas white, postscutellum brown, sternum pale brown, scutellum with two median bristles and one to two smaller setae on either lateral side. Legs mainly yellowish pale brown, LR 1.26. Wing (fig. 18, *d*) with macrotrichia only on apical part, fMCu under r-m, RL-V 37.5: 16.5: 34.5: 38.5. Hypopygium (fig. 18, *e*) with anal point slender and pointed, dorsal appendage bilobate, dorsal lobe larger and sparsely setigerous at tip, ventral lobe slender but as long as dorsal, ventral appendage with five normal setae and four small curved bristles on apical part, inferior appendage long, almost entirely pubescent and with long apical brushlike hairs.

Female: Body length 1.32 (1.11-1.48) mm.; wings 0.86 (0.83-0.92) mm. by 0.29 (0.29-0.31) mm. Generally as in male with usual sexual differences. Palp five-segmented (6.3: 7.5: 25: 25: 34.3); antenna pale brown, six-segmented (10.8: 20: 13.2: 13.7: 14.3: 14.3). LR 1.3 (1.24-1.35). Wings with dense macrotrichia, RL-V 25.5: 14.5: 33.3: 25.9. Abdomen yellow, subgenital sternite with large caudal incision, cercus earlike.

DISTRIBUTION: Japan, Caroline Is.

PALAU. BABELTHUAP: 104 females, 14 males, Ngaremlengui, at light, June 1957, Sabrosky; three females, Melekeiok, at light, May 1957, Sabrosky.

The Micronesia specimens differ slightly from the Japanese ones in coloration, value of AR, and shape of dorsal appendage of male hypopygium.

91. Tanytarsus (Tanytarsus) insulicolus Tokunaga, n. sp. (fig. 18, *f*).

Male: Body length 1.79-1.82 mm.; wings 1.0-1.04 mm. by 0.3-0.32 mm. Head with eyes separated above by one-third length of eye, palp five-segmented (6: 8.5: 26.5: 28.5: 41.5), AR 0.28-0.29, antenna with scape yellow, last segment subequal to preceding three to four segments taken together. Thorax far paler than in *pelagicus*, scutum and postscutellum yellowish brown, other parts mainly yellow. Legs yellow, pulvilli absent, LR 1.26-1.28. Wings very closely as in *pelagicus*, fMCu under origin of r-m, RL-V 33: 16: 33.5: 35. Abdomen yellow; hypopygium (fig. 18, *f*) also very closely as in allied species, but inferior appendage very small, ventral appendage with eight apical setae.

Female: Body 1.56 mm. long; wings 0.87 mm. by 0.33 mm. Generally yellowish white. Head with antenna probably six-segmented. RL-FT about 32: 24.5. Wings rather short-oval, with macrotrichia sparse, basal part of cell M_1 with only single line of trichia above stem of fMCu, RL-V about 24: 14: 32: 26.5. Subgenital plate and cercus as in allied species.

Holotype, male (US 66577), Ngaremlengui, Babelthuap I., Palau, at light, June 3, 1957, Sabrosky. Allotype, female (US), Pt. Oca, Guam, S. Mariana Is., light trap, June 29, 1945, Bohart and Gressitt. Paratypes, male with allotype; male, Melekeiok, Babelthuap I., Palau, at light, May 22, 1957, Sabrosky.

Other specimen. Palau: Male, Ngaremlengui, Babelthuap I., Palau, at light, June 3, 1957, Sabrosky.

DISTRIBUTION: S. Mariana Is. (Guam), Caroline Is. (Palau).

This small species is very similar to *pelagicus*, but can be separated by AR only 0.28-0.29, very small inferior appendage of the male hypopygium, and distribution of the macrotrichia of the female wing which is less hairy.

92. Tanytarsus (Tanytarsus) magnihamatus Tokunaga (fig. 18, *g*).

Tanytarsus magnihamatus Tokunaga, 1933, Philippine Jour. Sci. **51**: 362.

Small to minute yellowish-white species; AR about 0.53, female antenna five-segmented; LR about 1.96 in male and 1.84 in female; wing with anal lobe almost absent, in male macrotrichia rather sparsely and in female densely spread almost on entire surface, but bare areas along veins distinct.

Male: Body 1.93 (1.81-2.15) mm. long; wings about 1.29 (1.25-1.33) mm. by 0.38 (0.36-0.4) mm. Head yellowish brown, with eyes separated above by width of eye; palp with five segments in RL of 7.5: 10: 28.5: 31.5: 50; antenna yellowish brown or yellow, flagellum and plumose hairs brown, AR 0.53 (0.51-0.55). Scutellum with two median bristles and two to three smaller setae on either side. Legs almost entirely white, tibial combs almost confluent, spurs very unequal, LR about 1.96. Wing without anal lobe, with macrotrichia rather sparsely spread on entire surface, but bare areas along veins very broad, RL-V about 38.3: 21.3: 46.7: 43.3. Halter white. Hypopygium (fig. 18, *g*) without anal point, with style subtriangular and pointed caudad in lateral aspect, dorsal appendage massive, bilobate, dorsal lobe hemispherical and rather thickly setigerous, ventral lobe small and with two apical minute setae, ventral appendage with about 10 short bristles on apical half, inferior appendage large but shorter than ventral appendage, ending far before that and densely pubescent on apical two-thirds.

Female: Body 1.7 (1.5-1.98) mm. long; wings 1.17 (1.03-1.24) mm. by 0.42 (0.38-0.44) mm. Generally yellowish white or pale brownish yellow. Head with eyes separated above by half length of eye; palp five-segmented (9.3: 9.3: 29: 32.7: 49.3); antenna yellow, but apical part of last segment and neck parts of penultimate slightly fuscus, five segments in RL of 11.5: 24.5: 15: 15: 32. Scutellum with two to four setae on either lateral side besides two stronger median setae. Legs with RL-FT 42.3: 28.2, LR 1.84 (1.81-1.88). Wing with macrotrichia rather long and dense, but bare areas along veins distinct, RL-V 29.8: 21.3: 45.9: 34.5, fMCu under origin of r-m. Subgenital sternite rather elongate, tapered, truncate apically and with eight strong bristles on caudal margin; cercus (fig. 18, *g*) elongate, tapered and longer than 3.5 times basal width (41: 14).

DISTRIBUTION: Japan, S. Mariana Is., Caroline Is., Marshall Is.

S. MARIANA IS. GUAM: Female, Pt. Oca, light trap, June 1945, Bohart and Gressitt.

PALAU. BABELTHUAP: Two females, Ngiwal, light trap, 1 m., Dec. 1952, Gressitt; three females, male, Ngiwal, at light, May 1957, Sabrosky; female, Ngerehelong Pen., at light, May 1957, Sabrosky; female, two males, Melekeiok, at light, May 1957, Sabrosky; female, Ulimang, Dec. 1947, Dybas. PELELIU: Two females, 16 males, at light, May 1957, Sabrosky. KOROR: Female, SW. Koror, light trap, 25 m., Dec. 1952, Gressitt; male, Ngarabad, at light, May 1957, Sabrosky.

YAP. RUMUNG: Female, three males, at light, June 1957, Sabrosky.

TRUK. TON: Female, Mt. Unibot, light trap, 200 m., Dec. 1952, Gressitt.

MARSHALL IS. AILINGLAPALAP: Female, Woja I., Oct. 1952, Hatheway. JALUIT: Two females, Mejetto I., Aug. 1946, Townes; ARNO: Female, Ine I., at light, July 1952, Hatheway.

Micronesian specimens differ somewhat from the type specimens from Japan in the following points: In Japanese specimens, the male hypopygium has a small blunt anal point, the ventral appendage is longer, LR is about 1.5

in male, the cercus is relatively short and about 2.5 times as long as basal width. These differences are thought to show that the Micronesian specimens represent a local subspecies or form.

93. Tanytarsus (Tanytarsus) maritimus Edwards (fig. 18, *c*).

Tanytarsus maritimus Edwards, 1926, Zool. Soc. London, Proc. 2:794; 1928, Insects of Samoa 6(2):63.

Male: Body about 1.5-1.7 mm. long; wings about 1.0-1.2 mm. by 0.3 mm. General coloration yellowish white; head yellowish pale brown. Eyes widely separated above by one-third width of head; five segments of palp as 7: 8: 20: 23: 30. Antenna with scape yellow, flagellum and plumose hairs brown, AR usually 0.3 and at most about 0.54, last segments being subequal to preceding six segments taken together. Thorax with five bristles along caudal margin. Legs entirely yellowish white, mid and hind tibiae with combs separated and spurs unequal. Wing with fMCu just beyond r-m, RL-V about 31: 18: 36: 33.5. Abdomen uniformly yellowish pale brown or yellowish white; male hypopygium (fig. 18, *c*) with anal point vestigial or almost absent, style rather slender and with many erect setae on mesal side, dorsal appendage with dorsal lobe massive or hemispherical and sparsely setigerous, other two ventral lobes subequal in length or caudal one slightly shorter, bare and somewhat pointed, basal one clavate and with two apical setae, ventral appendage slender, with five to seven apical bristles and several small setae just beyond middle, inferior appendage rather slender and brushlike.

Female: Body about 2.17 mm.; wings about 1.25 mm. by 0.42 mm. Head with palp five-segmented (8: 10: 28: 30: 45); antenna pale yellow, but apical part of last segments slightly fuscus, five-segmented (13: 22: 15: 16: 34). Thorax with three pale brownish-yellow vittae on yellowish-white ground color, scutellum with four to eight setae along caudal margin. Legs with pulvilli vestigial, LR 1.83 (1.77-1.88). RL-V about 31: 21: 51: 36. Subgenital sternite somewhat trapezoid, tapered caudad, with shallow caudal concavity and about eight strong bristles arranged along caudal margin; cerci rather elongate, subrhombic and slightly longer than three times subbasal width.

DISTRIBUTION: Samoa, Caroline Is.

PALAU. BABELTHUAP: Female, Ulimang, Dec. 1947, Dybas; three females, Ngerehelong Pen., at light, June 1957, Sabrosky; 10 females, Ngaremlengui, at light, June 1957, Sabrosky; three females, Melekeiok, at light, May 1957, Sabrosky. KOROR: Six females, two males, Ngarabad, light trap, May 1957, Sabrosky; two females, Koror, at light, May 1957, Sabrosky.

CAROLINE ATOLLS. KAPINGAMARANGI: 10 females, May and July 1954, Niering. NOMWIN: Female, Fananu I., Feb. 1954, Beardsley.

TRUK. TON: 12 females, Netutu, Apr. 1949, Potts.

Edwards reported twice on this marine midge collected on Samoa by Buxton. I am supplementing his description by observations on the Micronesian material and a drawing of the male hypopygium. Specimens from Micronesia differ from the original specimens in the following points: The male antenna usually shows rather large value of AR and the wings of both sexes are more densely covered with macrotrichia than shown in Edwards' figures and resemble those of *esakii;* however, these characters vary somewhat individually.

94. Tanytarsus (Tanytarsus) latiforceps Tokunaga, n. sp. (fig. 19, *a*).

Small yellowish-white species, very closely allied to *esakii.* AR about 0.57, last segment of male antenna subequal in length to preceding six to seven segments combined, female antenna five-segmented, LR 1.89 in male and 1.75 in female, wings with macrotrichia sparsely spread in both sexes.

Male: Body 2.15 (2.02-2.21) mm. long; wings 1.27 (1.24-1.29) mm. by 0.37 (0.36-0.38) mm. Head with eyes separated above by one-third width of head, palp five-segmented (9.3: 10: 30: 34: 54), antenna with scape yellow, flagellum and plumose hairs yellowish brown, AR about 0.57 (0.55-0.62), five distal segments in proportions of 12.1: 12: 11.9: 12: 80. Thorax with six to eight setae along caudal margin. Legs with pulvilli small, tibial combs separated and spurs distinctly unequal, LR about 1.89. Wing with macrotrichia rather sparsely spread over surface, but bare areas along veins very broad, costa ending far beyond tip of M_{3+4} and slightly before wing tip, fMCu slightly beyond r-m, RL-V about 35.3: 23.3: 47.3: 39.7. Halter white. Abdomen yellowish white; hypopygium (fig. 19, *a*) completely without anal point, style subtriangular in lateral aspect, broadly extending dorsad on basal part, dorsal appendage very scantily setigerous, unequally trilobate, but dorsal and ventral lobes subequally fingerlike and short, middle lobe far longer and with two minute apical setae, ventral appendage slender, with seven to eight small apical bristles and few small setae at middle, inferior appendage as in *tricuspis.*

Female: Body 1.79 (1.63-1.95) mm. long; wings 1.06 (1.03-1.09) mm. by 0.39 (0.38-0.4) mm. Generally as in male. Head with eyes reniform and widely separated by two-fifths width of head, palp five-segmented (9: 9: 25: 31: 50.5), antenna entirely yellowish white, five-segmented (12.3: 23: 13.7: 15.3: 31), intermediate flagellar segments subfusiform and neck parts indistinct. Legs with pulvilli indistinct, LR 1.7-1.73. Wing with macrotrichia more densely spread than in male, but bare areas along veins distinct and broad as in *esakii,* RL-V 28: 16.5: 44.5: 31.5. Cercus elongate, pointed and thrice as long as basal width, subgenital sternite tapered, with caudal concavity very shallow and usually six long bristles along caudal margin.

Holotype, male (US 66578), Ngiwal, Babelthuap I., Palau, at light, May 20, 1957, Sabrosky. Allotype, female (US), Ngarabad, Koror I., Palau, at light, May 17, 1957, Sabrosky. Paratypes, male with holotype; male, Ulimang, Babelthuap I., Palau, Dec. 19, 1947, Dybas; three males, Melekeiok, Babelthuap I., Palau, at light, May 22, 1957, Sabrosky; three females, Ngaremlengui, Babelthuap I., Palau, at light, June 3, 1957, Sabrosky; two males, Babelthuap I., Palau, Dec. 16, 1947, Dybas; two females, Peleliu I., Palau, Aug. 30, 1945, Dybas; male, Peleliu I., Palau, at light, May 28, 1957, Sabrosky.

Other specimens. Palau. Babelthuap I.: 27 females, 19 males, Ngaremlengui, at light, May 22 and June 3, 1957, Sabrosky; 23 females, five males, Ngiwal, at light, May 19 and 20 and June 31, 1957, Sabrosky; 295 females, four males, Melekeiok, at light, May 22 and June 3, 1957, Sabrosky.

DISTRIBUTION: Caroline Is. (Palau).

This new species is closely related to *T. esakii,* but the shape of the dorsal appendage of the male hypopygium is obviously different. The females of these species are very difficult to separate and are distinguished only by the relative lengths of R_1 and R_{4+5}.

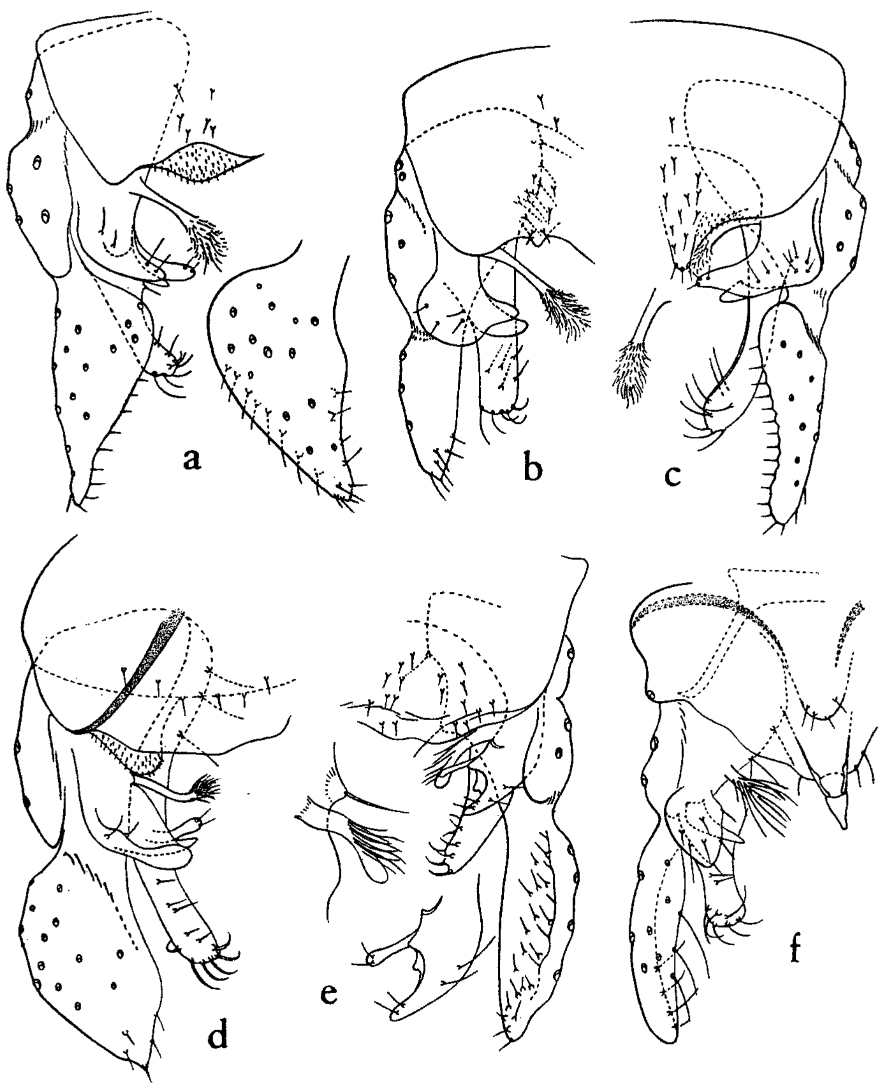


FIGURE 19.—Male hypopygia: **a-d,** *Tanytarsus* (s. str.): *a, T.* (*T.*) *latiforceps; b, T.* (*T.*) *brachyurus; c, T.* (*T.*) *tricuspis; d, T.* (*T.*) *esakii.* **e, f,** *Tanytarsus* (*Stempellina*): *e, T.* (*S.*) *emarginatus; f, T.* (*S.*) *gressitti.*

95. Tanytarsus (Tanytarsus) brachyurus Tokunaga, n. sp. (fig. 19, *b*).

Minute yellowish or white species, closely allied to *maritimus* and *halophilae*. Male last antennal segment only subequal to preceding two or three segments taken together, AR 0.18 (0.17-0.19), female antenna five-segmented, LR about 1.96 in male and 1.85 in female, wing of male with macrotrichia only along marginal area and of female densely spread all over surface.

Male: Body 1.8 (1.63-1.95) mm. long; wings 1.04 (0.99-1.08) mm. by 0.33 (0.33-0.34) mm. Color generally yellowish white. Head with eyes widely separated above by about half width of head, five segments of palp with RL about 9.7: 8: 23.7: 30: 45.3; antenna yellowish white, AR 0.18 (0.17-0.19), RL of last five segments about 12: 11.3: 11: 10.7: 23.2. Thorax with five to seven setae along caudal margin of scutellum. Legs entirely yellowish white, mid and hind tibiae with two combs separated and two spurs unequal, pulvilli indistinct, LR 1.96 (1.92-2.0). Wing with anal lobe almost absent, macrotrichia sparsely spread only along marginal area, in cell R_5 trichia not found on basal half and in cell M_2 trichia spread on apical part beyond middle of M_{3+4}, RL-V 30.7: 16: 37: 36. Halter white. Abdomen yellowish white; hypopygium (fig. 19, *b*) with anal point vestigial and triangular, style subtriangular in lateral aspect, dorsal appendage bilobate, dorsal lobe hemispherical, sparsely setigerous and with blunt beaklike projection, ventral lobe rather large, ventral appendage strong, almost straight, with five small apical bristles and several small preapical setae, inferior appendage slender and brushlike.

Female: Body 1.89 (1.6-2.17) mm. long; wings 1.04 (0.99-1.08) mm. by 0.4 (0.39-0.42) mm. Color uniformly white, but head with vertex somewhat yellowish. Head with eyes widely separated by four-fifths length of eye, palp five-segmented (8.8: 7.6: 21.6: 29.5: 44.6), antenna slightly yellowish, distal third of last segment sometimes slightly fuscus, five-segmented (11.2: 19.5: 14.4: 14.8: 27.6). Thorax sometimes yellowish, scutellum with eight setae along caudal margin. Legs white or pale yellow, with pulvilli minute, mid and hind tibiae with two unequal spurs, one minute, the other long, RL-FT 38.7: 24.8, LR 1.85 (1.75-1.98). Wing with dense macrotrichia almost all over surface, but bare areas along veins distinct, although narrow, fMCu under origin of r-m or just beyond it, anal lobe almost absent, RL-V 27: 17.8: 42.5: 33. Subgenital sternite rather long, tapered, truncate apically, with four to five long bristles along caudal margin, cerci slender, rather pointed, about three times as long as subbasal width.

Holotype, male (US 66579), Angaur I., Palau, Feb. 3, 1948, Dybas. Allotype, female (US) with holotype. Paratypes, 19 females, three males with types; three females, Ulimang, Babelthuap I., Palau, Dec. 19, 1947, Dybas.

DISTRIBUTION: Caroline Is. (Palau).

In the related species, *T. halophilae,* the male hypopygium is provided with a spatulalike and setigerous anal point, the ventral appendage has about three spoonlike, preapical bristles, the dorsal lobe of dorsal appendage is not hemispherical, the hairs of the brushlike inferior appendage are very small. In the other allied species, *T. maritimus,* the male hypopygium is provided with a longer ventral appendage with stronger apical bristles, the dorsal appendage is bilobed into more slender lobes, and the hairs of the brushlike inferior appendage are longer. The females of these three species are difficult to distinguish from each other but, except for some intermediate forms, may be identified by the characters given in the key.

96. **Tanytarsus (Tanytarsus) tricuspis** Tokunaga, n. sp. (fig. 19, *c*).

Minute, yellowish-white species, very close to *maritimus,* but male rather easily distinguished by the specific shape of male hypopygium. AR only 0.18, wing with rather sparsely spread macrotrichia and bare areas along veins very broad.

Male: Body about 1.95 mm. long; wings about 1.27 mm. by 0.38 mm. Almost entirely yellowish white. Head with eyes widely separated above by more than one-fourth width of head; five segments of palp about 11: 10: 27: 37: 58 in RL; antenna with ultimate segment slightly longer than preceding two segments combined, AR 0.18, distal five segments 13: 12: 11.5: 11: 25. Scutellum with eight setae along caudal margin. Legs with pulvilli indistinct, fore tarsi missing. Wing rather slender with anal cell narrow, anal lobe almost absent, macrotrichia sparsely spread all over surface, bare areas along veins broad, fMCu slightly beyond r-m, costa ending distinctly before wing tip but beyond tip of M_{3+4}, RL-V about 36: 22: 46: 43. Halter white. Hypopygium (fig. 19, *c*) with anal point vestigial, style rather slender, dorsal appendage footlike, unequally trilobate, finely setigerous on dorsal side, dorsal lobe minute, middle lobe largest and with three minute apical setae, ventral lobe fingerlike, ventral appendage rather slender, with about nine small apical bristles, inferior appendage very small, slender, with apical half represented by tuft of very minute hairs.

Female: Unknown.

Holotype, male (US 66580), Angaur I., Palau, Feb. 3, 1948, Dybas.

DISTRIBUTION: Caroline Is. (Palau).

The present new species is closely related to *T. maritimus;* however, the male hypopygia of the two species distinctly differ. In the new species, the middle lobe of the dorsal appendage is not clavate and is far longer than the ventral lobe, the hairs of the apical brushlike part of the inferior appendage are very minute, and the ventral appendage is not provided with setae just beyond the middle.

97. **Tanytarsus (Tanytarsus) esakii** Tokunaga (fig. 19, *d*).

Tanytarsus esakii Tokunaga, 1940, Philippine Jour. Sci. **71**: 224.

The original description is supplemented by observations on additional material as follows:

Small yellow species, usually scutal vittae almost absent; AR 0.37-0.43 and female antenna five-segmented; scutellum with six, rarely eight, setae along caudal margin; LR about 1.75 (1.6-1.9); wing macrotrichia rather sparse in male, dense in female, bare areas along veins distinct in both sexes.

Male: Body 1.79 (1.69-1.9) mm. long; wings 1.11 (0.99-1.26) mm. by 0.35 (0.33-0.36) mm. Head with eyes separated above by half length of eye; palp five-segmented (7.7: 9: 24: 27.3: 39); AR 0.39 (0.37-0.43), last antennal segments usually slightly shorter than preceding five segments combined. Thorax usually with six setae along caudal margin of scutellum. RL-FT 39.6: 25.8, LR 1.75 (1.6-1.9), tibial combs separated and with two distinctly unequal spurs, pulvilli rather small. Wing macrotrichia quite as in original figure, fMCu under origin of r-m, RL-V 32: 19: 38.5: 30. Halter yellow or white. Abdomen yellowish white; hypopygium (fig. 19, *d*) yellow, anal point absent, tergite 10 divided into large paired pubescent lobes under preceding tergite, style broad, oval and rather sharply pointed caudad, dorsal appendage trilobate, dorsal lobe broad, subtriangular, with two small setae at middle, two similar setae on blunt apex, basal lobe slender, clavate and with two minute apical setae, caudal lobe clawlike, pointed and as large as basal lobe, ventral appendage rather slender, with five to

seven apical small bristles and several minute setae on apical half, inferior appendage very slender, with bare stem undulate and apical brush of minute hairs.

Female: Body 1.56-1.82 mm. long; wings 1.09 (0.98-1.2) mm. by 0.4 (0.36-0.43) mm. General coloration and structure similar to male. Five segments of palp in RL of 9: 9: 22.3: 30.3: 48; antenna yellow, but apical two-thirds slightly fuscus, five-segmented (11.7: 23.7: 13.7: 15.3: 30.7). LR 1.7-1.72, RL-FT 39.2: 27. Wing macrotrichia moderately dense, spread all over surface, but bare areas along veins not distinct, fMCu under or just beyond origin of r-m, RL-V 28.8: 19.8: 44.5: 33.8. Cercus elongate, tapered and about 3.6 times as long as basal width.

DISTRIBUTION: Caroline Is., Marshall Is.

PALAU. BABELTHUAP: Male, Melekeiok, at light, May 1957, Sabrosky. KOROR: Five females, Koror, at light, May 1957, Sabrosky.

YAP. Female, Tomil Distr., at light, July 1950, Goss.

CAROLINE ATOLLS. PINGELAP: Male, Jan. 1953, Gressitt.

TRUK. TON: Ten females, Netutu, June 1949, Potts.

KUSAIE. 28 females, nine males, Mutunlik, light trap, 16 m., Jan. 1953, Gressitt; 784 females, 38 males, Mutunlik, light trap, 22 m., Jan.-Apr. 1953, Clarke; 30 females, Pukusrik, Apr. 1953, Clarke; 13 females, four males, Hill 541, at light, 165 m., Mar. 1953, Clarke; five females, male, Funaunpes, Jan. 1953, Clarke.

MARSHALL IS. JALUIT: Female, male, Jabwar I., May 1956, Gressitt.

In the original description, the clawlike caudal lobe of the dorsal appendages of the male hypopygium and the paired, reduced, tenth hemitergites were overlooked; the apical brushlike structure of the inferior appendage of the male hypopygium was too large in the drawing.

Subgenus **Stempellina** Bause

Stempellina Bause, 1914, Archiv Hydrobiol. Suppl. **2**: 120.—Goetghebuer, 1928, Faune France **18**: 120; 1938, IN Lindner, Flieg. Palaearkt. Reg. **13**, c: 96.—Freeman, 1958, British Mus. (N.H.) Ent. Bull. **6**: 352.

Tanytarsus subgenus *Stempellina,* Edwards, 1929, Ent. Soc. London, Trans. **77**: 419.

Eyes bare; frontal tubercles present and small or absent. Antennae of male usually less than 14-segmented (often 11, but rarely 14); antennae of female five- or six-segmented. Mid and hind tibial combs small, well-separated, one comb with slender spur, but other always without distinguishable spur and usually quite unarmed. Wings with anal lobe reduced and often absent, fringe long, costa often, but not always, ending above or before tip of M_{3+4}.

For the subgeneric characters of *Stempellina,* the reduced number of the scutellar setae, the 11-segmented male antennae and the short costa not extending beyond level of tip of M_{3+4} are usually given, but I believe the most important and reliable character for *Stempellina* is the development of the tibial spurs and combs.

Key to Micronesian Species of Subgenus Stempellina

Anal point of male hypopygium absent; frontal tubercles absent............**98. emarginatus**
Anal point of male hypopygium present; frontal tubercles present................**99. gressitti**

98. Tanytarsus (Stempellina) emarginatus Tokunaga, n. sp. (fig. 19, *e*).

Small, yellowish-white species, AR 0.65-0.83 and female antenna five-segmented, scutellum usually with one or two lateral small setae besides two median bristles, LR 1.67-1.73, tibial combs small and widely separated, tibial spurs always single, wing very sparsely hairy, anal lobes absent and wing cuneiform.

Male: Body 2.16-2.21 mm. long; wings 1.2-1.24 mm. by 0.34 mm. Head very pale brown, with eyes separated above by two-fifths width of head, no trace of frontal tubercles; palp five-segmented (7: 8.5: 21.5: 27: 44); AR 0.76 (0.65-0.83), scape yellow, other segments and plumose hairs brown, last segment subequal to preceding nine to ten segments taken together. Thorax entirely yellowish white, scutellum usually with one or two small lateral accessory setae besides two median bristles. Legs white, but fore tibia somewhat brownish, tibial combs small, widely separated and with only one slender spur, pulvilli absent, LR 1.71 (1.68-1.73). Wing narrow, anal lobe absent, macrotrichia very sparse, spread only on apical parts of cells R_2, M_2, and M_4 and arranged in single short longitudinal line on apical part of cells R_5 and M_2, fMCu under or just beyond origin of r-m, RL-V 38.5: 22.5: 41.5: 40.5. Halter white. Abdomen yellowish white; hypopygium (fig. 19, *e*) without anal point, style rather elongate, dorsal appendage trilobate, dorsal lobe rather broad, widely concave on mesal side and very poorly hairy on apical part, basal lobe, drumsticklike and very slender, caudal lobe minute and visible in mesal emargination of dorsal lobe, ventral appendage rather short, tapered and with seven to eight small bristles on mesal side of apical half, inferior appendage with one oblong apical lamella and several hairs on preapical part.

Female: Body 1.18 (1.08-1.3) mm. long; wing 0.92 (0.9-0.93) mm. by 0.28 (0.26-0.29) mm. Slightly paler brownish yellow than in male but other characters similar with usual sexual differences. Head with eyes separated above by slightly less than length of eye, palp five-segmented (6: 8.3: 17.7: 18: 35.3), antenna with scape yellow, following segments very pale brown, intermediate flagellar segments subfusiform and with neck parts indistinct, last segment slightly more brownish, five-segmented (11: 23.5: 14: 15: 23). Wing distinctly cuneiform, macrotrichia spread only on apical area and along caudal margin, arranged on longitudinal lines of apical one-third of cell R_5, between M_{1+2} and M_{3+4} and above M_{3+4} and stem of fMCu, fMCu under origin of r-m, RL-V 26: 14.7: 35.7: 28. LR 1.69 (1.68-1.7), RL-FT 30.5: 19.5. Abdomen entirely yellowish white, with cercus round.

Holotype, male (US 66581), Ngarabad, Koror I., Palau, May 17, 1947, Dybas. Allotype, female (US) with holotype. Paratypes, male with holotype; two males, Ngaremlengui, Babelthuap I., Palau, at light, July 1, 1957, Sabrosky; four males, Melekeiok, Babelthuap I., Palau, at light, May 22 and June 3, 1957, Sabrosky.

Other specimens, Palau, Babelthuap I., male, Ngaremlengui, at light, June 3, 1957, Sabrosky, eight females, same locality, July 1, 1957, Sabrosky.

DISTRIBUTION: Caroline Is. (Palau).

This new species is intermediate between *Tanytarsus* and *Stempellina* in the following points: the male antenna is 14-segmented, the frontal tubercles

are absent, the scutellum is provided with small accessory lateral setae besides two middle bristles, the costa ends far beyond the level of the apex of M_{3+4} (subgeneric characters of *Tanytarsus*) and the tibial combs of the two pairs of posterior legs are small, well-separated and only one armed with a slender spur, the wings are fringed with long setae, the anal lobe is absent, and the wing is cuneiform (as in *Stempellina*).

This species is similar to *T. gressitti,* but easily distinguished from it and other species by the highly specific male hypopygium, especially the structure of the dorsal and inferior appendages, and the highly reduced macrotrichia of the wings of both sexes, together with the specific values of AR and LR.

99. **Tanytarsus (Stempellina) gressitti** Tokunaga, n. sp. (fig. 19, *f*).

Minute, yellow or yellowish-white species, close to *ovatus*. Head with small frontal tubercles; AR 0.54 and female antenna five-segmented; scutellum usually with only two median setae, rarely one lateral seta, on one or both sides; LR 1.61-1.7, tibial combs with only one spur; wing subcuneiform, macrotrichia sparsely spread along marginal or apical area and only linearly arranged on middle area.

Male: Body 1.58 (1.37-1.82) mm. long; wings 1.04 (0.96-1.16) mm. by 0.29 (0.27-0.33) mm. Head with frontal tubercles small and as long as diameter of facet, eyes separated above as wide as one-third of length of eye; palp five-segmented (5:5:18:21:31); AR 0.63 (0.54-0.72), scape yellow, flagellum and plumose hairs pale brown, but last two segments more brownish. Thorax entirely white, scutellum with only two median bristles. Legs entirely white, tibial combs separated, spur single, very small, pulvilli absent, RL-FT 50.2:22.3. Wing cuneiform, with macrotrichia very sparse, spread on apical parts of cells R_5, M_2, and M_4, linearly arranged along caudal margin and above stem of fMCu, beneath M_{1+2} and on middle longitudinal line of cell R_5, fMCu under basal one-fourth of R_1, RL-V 28:20:29:35. Halter white. Abdomen entirely white; hypopygium (fig. 19, *f*) with anal point short and pointed, style rather slender, dorsal appendage bilobate, dorsal lobe oval and sparsely setigerous, ventral lobe beaklike and as long as dorsal lobe, ventral appendage slightly narrowed at middle, with six small apical bristles and a few small setae beyond middle, inferior appendage small, somewhat palmate, with very slender apical hairlike lamellae besides small setae.

Female: Body 1.15 (1.04-1.25) mm. long; wings 0.89 (0.83-0.94) mm. by 0.28 (0.26-0.3) mm. Very similar to male in color and structure. Eyes separated above by three-fourths length of eye; five palpal segments about 6.8:5.7:16.3:21.3:33; antenna with scape yellow, other segments pale brown, five-segmented (10.6:23:14.7:15.6:24), intermediate flagellar segments fusiform. Scutellum with two middle bristles and one or two lateral small setae. LR 1.63 (1.58-1.7), RL-FT 29.5:19.2, tibial spurs single. Wings similar to male in shape and distribution of macrotrichia, fMCu under r-m, RL-V 25.6:14:34.8:26.4. Abdomen yellow, with cercus white and discoidal.

Holotype, male (US 66582), Ngaremlengui, Babelthuap I., Palau, at light, May 7, 1957, Sabrosky. Allotype, female (US), same locality as for holotype, June 3, 1957, Sabrosky. Paratypes, female with allotype; male with holotype; six females, Melekeiok, Babelthuap I., Palau, at light, May 22, 1957, Sabrosky; male, Hill behind Yaptown, by light trap, 50 m., Yap I., Dec. 1, 1952, Gressitt.

Other specimen, Palau: Male, Ngaremlengui, Babelthuap I., July 1, 1957, Sabrosky.

DISTRIBUTION: Caroline Is. (Palau, Yap).

This species is similar to *T. ovatus,* especially in the structure of the male hypopygium. *T. ovatus,* however, is distinguished by the following specific characters: AR is slightly smaller than 0.5, the tibial combs are provided with a single spur, the thorax bears faint scutal vittae, the wing is slender and not distinctly cuneiform, the wing macrotrichia is slightly denser, and the anal point of the male hypopygium is dotted.

Genus **Pontomyia** Edwards

Pontomyia Edwards, 1926, Zool. Soc. London, Proc. **51**: 796.—Buxton, 1926, Zool. Soc. London, Proc. **51**: 807.—Tokunaga, 1932, Coll. Agr. Kyoto Imp. Univ., Mem. **19**: 1-56.

Male: Antennae 14-segmented, long, slender, bare and with basal large antennal socket; palp large and two-segmented; labella reduced, eyes pubescent. Fore leg long, without claws; first tarsal segment longer than tibia; mid leg remarkably short and stout, claws well developed; hind leg long, with claws small, tibial combs and pulvilli absent, spurlike projection present on mid and hind tibia. Wings reduced in size, subtriangular and consisting of long basal and short apical parts, venation indistinct. Hypopygium rotated through 180 degrees. *Female:* Vermiform, without appendages except for rudimentary mid and hind legs.

Marine in habitat.

Only three species of this marine genus have been recorded, all from the Pacific. However, *cottoni* Womersley (South Australia) seems to be identical with the widely distributed *natans* Edwards, which is not yet recorded from Micronesia.

100. **Pontomyia oceana** Tokunaga, n. sp. (fig. 20).

Small, very pale brownish-yellow species with highly setigerous palps and legs, black and thickly sclerotized male hypopygium, distinctly differing from known species.

Male: Body about 1.86 (1.82-1.9) mm. long; wing elongate, subtriangular, 1.0 (0.86-1.13) mm. by 0.25 (0.23-0.27) mm. Head, thorax, legs, and abdomen very pale brownish yellow, hypopygium black, scutum with three very faint and more yellowish vittae.

Head (fig. 20, *a*) small, flat, round, without setae; proboscis broad, short, slightly fuscus along apical margin; eyes rather small, distinctly pubescent, deeply constricted into small ventral and large dorsal part, these parts with seven to eight and 24 to 25 facets respectively, widely separated above by half length of eye. Mouthparts reduced, labella very small, subtriangular, with only two minute setae; palp large, stout, highly setigerous with strong setae, only two-segmented in proportion of 33.5: 48, both segments elongate oval, no trace of segment 3; antenna filiform, very long, mainly brown, but pale yellowish on basal three and apical two segments, with segmentlike basal antennaria, true antenna 14-segmented, scape small, subspherical, other segments all cylindrical, segment 2 with two strong apical setae, 3 with two to three apical setae half as long as following segments, other segments without setae except for delicate velvetlike sensory hairs, last segment round at tip; RL-A 10.5: 20.3: 27: 27.2: 26.4: 27.5: 27.2: 27.5:.26.2: 25.8: 24.5: 26.4: 22.2: 32.4.

Thorax entirely covered with velvetlike pubescence and without setae. Legs mainly very pale brownish yellow, rather more setigerous than in other species with coxae,

trochanters, and articulations of segments pale brown, LR 1.04-1.1, RL-L 35: 47: 50: 38.5: 36: 31.5: 22.3+2.8 in fore leg, 24.5: 32.5: 8.3: 2.8: 2.3: 1.8: 2.8 in mid leg, 30.5: 28: 52.5: 33.5: 29.3: 19.3: 12.5 in hind leg; fore leg filiform, very long, claws and other terminal lobes absent, tibial spur absent, last tarsal segment (fig. 20, *b*) very sparsely setigerous with minute setae only, sharply pointed and needlelike at tip; mid leg short, stout, femur with basal ventral setigerous swelling, tibia with stout apical spur (fig.

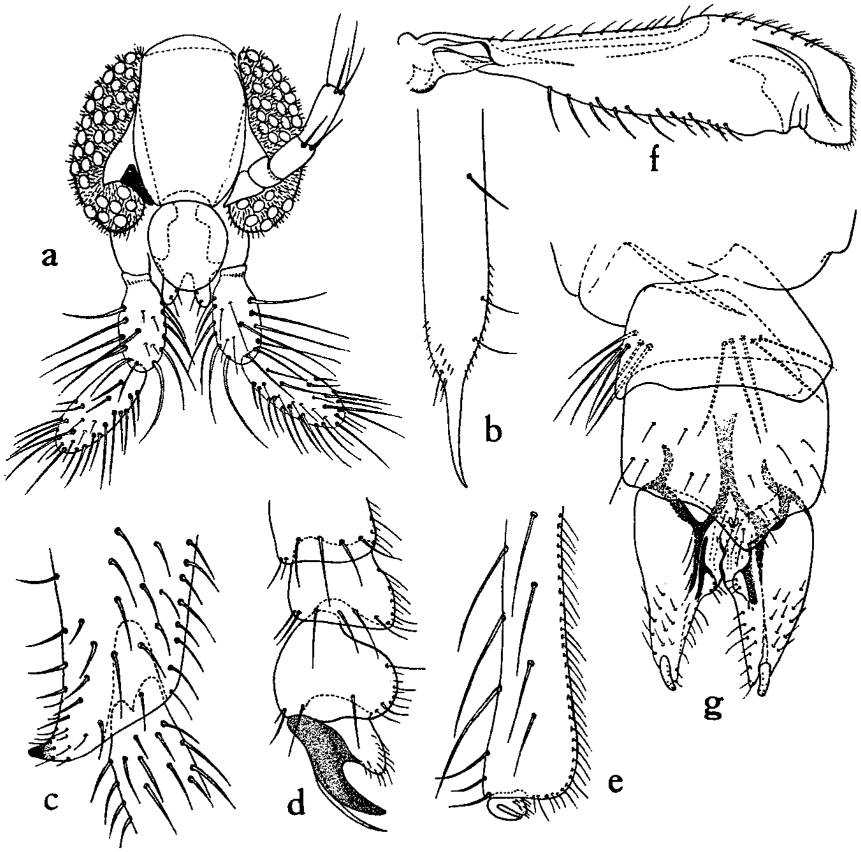


FIGURE 20.—*Pontomyia oceana,* male: **a**, head with base of antenna; **b**, tarsal tip of fore leg; **c**, tibial tip of mid leg; **d**, distal tarsal segments of mid leg; **e**, tarsal tip of hind leg; **f**, wing; **g**, hypopygium.

20, *c*), tarsal segment very short, segment 1 about 2.5 times as long as wide, segments 2 to 3 as long as wide, 4 shorter than width, last segment (fig. 20, *d*) as long as wide, claws strong, and with accessory hyaline setalike lobe (lamella ?), empodium very short; hind leg mostly setigerous with strong bristles, with basal articulations between proximal three segments strongly deflected, femur broadened apically, tibia thickened, with apical projection large, curved ventrad and ending in stout spur, last tarsal segment (fig. 20, *e*) sparsely setigerous, slightly broadened apically, with minute claws

on dorsal part of truncate apical end. Wing (fig. 20, *f*) oarlike, consisting of basal triangular two-thirds and apical rhombic one-third, venation almost atrophied, basal triangular part with 10 to 14 stiff setae on costal margin and 15 to 18 longer setae on anal margin, apical rhombic part truncate at apex, with 14 to 18 small setae on costal margin, only pubescent on apical margin and almost bare on anal margin; squama bare. Halter normal, white.

Abdomen with tergites very scantily setigerous, sternites more thickly setigerous, but these setae very pale and inconspicuous, except for those on segments 7 to 8; hypopygium (fig. 20, *g*) turned, yellowish brown, but coxites and styles black; anal point blunt, subtriangular and setigerous; coxites very large, conical, distinctly tapered, fused with each other on basal one-half, with caudal tip sharply pointed, style very small, dark, fingerlike and movably articulated to preapical part of coxite; basal appendages almost completely atrophied, small padlike swelling (reduced ventral appendage?) located at middle of mesal side of coxite and with few setae.

Female: Unknown.

Holotype, male (US 66583), Ngaremlengui, Babelthuap I., Palau Is., swarming on surface of water on top of marine reef, Jan. 2, 1957, McGouan. Paratypes, five males, same data as for holotype.

DISTRIBUTION: Caroline Is. (Palau).

P. oceana obviously differs from the known species of *Pontomyia* by the setigerous general appearance, the two-segmented palp, the needlelike apex of the last tarsal segment of the fore leg, the truncate apex of the wing, the thickly sclerotized and immovably fused coxites, and the greatly reduced basal appendage of the hypopygium. This may be the third species of the genus.